REFLECTIONS
ON THE
Works of God;

By

C. C. STURM.

Translated from the German

By The

Rev.d D.r Balfour

VOL. II.

LONDON:
Printed for R. Scholey, 46, Paternoster [illegible]
MDCCCXXVIII.

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REFLECTIONS

UPON

THE WORKS OF GOD

AS

DISPLAYED IN NAT[illegible]

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JULY I.

Foreign Plan[illegible]

ALL our different sorts of corn, [illegible] vegetables, derive their origin from for[illegible]es, generally those of a higher temperature than ours. The greatest part of them came from Italy; Italy obtained them from Greece; and Greece from the East. When America was discovered, many plants and flowers were found that till then were unknown, and have since been transplanted to Europe, where they have been cultivated with great success; and the English still take great pains to cultivate in their own country many different plants from North America.

Most of the different species of corn, which form the best kind of nutriment for men and animals, are graminous; and though they are now completely naturalised to our soil, and the fields are covered with them, they are of foreign growth. Rye and wheat are indigenous in Little Tartary and Siberia, where they still grow without culture. From what country barley and oats were first introduced, we are ignorant; but we may be assured, they are not natives of this climate, or it would not be necessary to cultivate them. Rice is the produce of Ethiopia, whence it was carried into the East, and afterwards to Italy. Since the commencement of the eighteenth century, it has been cultivated in America, and we now import from that country great quantities of this useful grain. Buckwheat originally came from Asia; it was introduced into Italy at the time of the crusades, from whence it was brought to Germany.

Most of our pulse and herbs have also a foreign origin. Borage comes from Syria; cresses from Crete; the cauliflower from Cyprus; and asparagus from Asia. We are indebted to Italy for the chervil; to Portugal and Spain for the dill seed; to the Canary Islands for fennel; and to Egypt for anniseed and parsley. Garlic is a production of the East; shallots come from Siberia, and the horse-radish from China. We are indebted to the East Indies for kidney-beans: to Astrican for pompions: to France for lentils; and to Brazil for potatoes. The Spaniards brought the tobacco-plant from Cuba, where the finest species of tobacco are found.

Some of our most beautiful flowers are also the produce of foreign countries. Jessamine comes from the East Indies; the elder tree from Persia; the tulip from Cappadocia; the narcissus or daffodil from Italy; the lily from Syria; the tube-rose from Java and Ceylon; the pink from Italy; and the aster from China.

Let us regard these gifts of Nature with joy and gratitude, and thank our heavenly father for the abundance of his bounty, in thus contributing to our pleasure and well being, by making the remotest regions of the earth tributary to our necessities. Let us also endeavour to become acquainted with the nature of the globe which we inhabit. There is an universal transmigration over all the earth; men, animals, and vegetables are transplanted from one country to another; and may we all, wherever our lot may be cast, endeavour to do our duty as men, and so live that our names shall be revered by the just and the good whilst living, and when happily transplanted to that country where ur toils shall end, and our troubles cease, our memory shall be blessed, and our departure be lamented, by thousands who have tasted of the sweets of our converse, and received the benefits of our exertions for the general good of mankind!

JULY II.

Transformation of Caterpillers.

THE transformation of a caterpiller into a butterfly is a very curious phenomenon, and highly deserving of our attention. The manner in which caterpillars prepare for their change is truly wonderful! they do not immediately become butterflies, but pass first through a sort of middle state. After shedding its coat three or four times, the caterpillar strips itself to its last skin, and becomes a substance not in the least resembling a living creature. It is then enveloped in a hard shell called chrysalis or nympha, in which state it remains two or three weeks, sometimes even for six or ten months, until at length it comes out in the form of a butterfly.

There are two kinds of butterflies; the wings of one are raised, those of the other are flat; the first species fly during the day, the latter by night. The catterpillar of the night-butterfly spins a cone, and shuts itself up in it when the time of its transformation approaches. Those which, when become butterflies, fly during the day, suspend themselves in the open air on a tree, a plant, a wall, &c. In order to do this, they spin themselves a very small web, with an extremely fine thread, and then suspend themselves in such a manner that their heads are a little bent back towards the top. Some of these caterpillars, particularly those of the hairy species, remain in this state, hanging perpendicularly with their heads downward; others spin a thread, which passes round the middle of their body, and which is fastened at both sides. In one or other of these ways all caterpillars of the day-butterfly prepare for the great revolution they are about to undergo. Thus both species of caterpillars bury themselves alive, and seem quietly to await the termination of their caterpillar state, as if they knew that after a short repose thy would receive a new existence, and appear again under a more brilliant form.

From considering the transformation of the caterpillar into the butterfly, we may proceed to the consideration of a much more noble and exalted subject, the death and resurrection of the righteous. Death resembles a state of sleep, a soft repose, in which our nature rests after the toils, the pains, and the miseries of this life. For the space of a moment we are deprived of sensibility and motion, that we may awaken to glory and a happy existence.

What is a caterpillar? A creeping worm, insignificant and despised, which, whilst it crawls along through life, is exposed to various accidents and injuries. And what is man? Is his condition in this world much better? Is he affluent and fortunate, he flutters gaily in the beams of prosperity, and often, equally insignificant with the butterfly, struts his hour, and passes into airy nothing, unlamented and unregarded. But these, compared with the children of penury and misfortune, are few: the greater part of men have to pass from their cradle to their grave through toil, misery, and poverty; most have to labour from morn till night like beasts of burthen, without the power or the hope of enlarging their minds, and expanding their ideas beyond the confined atmosphere of their workshop, or the ale-house where they herd together to solace themselves with smoke and beer after the fatigues of the day.

As the caterpillar prepares with care for its transfor-ion, and the state of inaction and insensibility which it is shortly to undergo; so in a different way, but not less earnestly, does the good man prepare for, and expect with a cheerful acquiescence and fond hope, that awful change when he is to undergo a temporary death, to enter into a joyful state of perfection and immortality.

The sleep of the caterpillar is not perpetual, it is merely the precursor of a new state of existence; after its transformation it appears again more perfect and brilliant: before, it crept upon the earth; it now flies in the air, and lightly skims over the surface of a thousand flowers, sipping honey and nectareous dew.

In all this we may observe a lively emblem of the death and resurrection of a righteous man. That body which was feeble, sensual, and gross, refined from its earthly nature, puts on a glorious immortality, and is clothed with perfection; that mind which was so limited in its faculties and confined in its powers, subject to passions and emotions that degraded its heavenly essence, so contracted and weak that it could not penetrate mists of prejudice, and so blind that it could not perceive truth, now, pure as light, and boundless as infinity, views the whole extent of nature, and sees at once millions of worlds; communes with angels, and expands to the infinite God, the source of all power, wisdom, and glory. We have here an important lesson: if this be the glorious change we expect, let us make timely and effectual preparation for it. If our present state be but transitory and imperfect, let us not make it our chief object; let not the few moments which are allotted us for our preparation for eternity, be mispent, or the reason why we have them mistaken.

JULY III.

The Silk-worm.

THE genus of caterpillars, which we have just seen, as divided into two general classes, one of which comprehends the diurnal, the other the nocturnal butterflies, is farther divided into different families, each of which has its distinct characteristics and properties.

Thus the silk-worm is a species of caterpillar, and like it, is formed of several moveable rings, and is well furnished with feet and claws, to rest and fix itself where it pleases. It has two rows of teeth, which do not move upwards and downwards, but from right to left, which enables it to press, cut, and tear the leaves in every direction. Along the whole length of its back we perceive through its skin a vessel which performs the function of a heart. On each side of this insect are nine orifices, which answer to as many lungs, and assist the circulation of the chyle or nutritive juice. Under the mouth is a kind of reel with two holes, through which pass two drops of the gum with which its bag is filled; they act like two distaffs, continually furnishing it with the materials of which it makes its silk. The gum which distils through the two orifices takes their form, lengthens into a double thread, which presently loses the fluidity of the liquid gum, and acquires the consistence necessary to support or to envelope the worm. When that time arrives it joins the two threads together, by gluing them one over the other with its fore feet. This double thread is not only very fine, but also very strong, and of great length. Each bag has a thread which is nearly five hundred German ells long; and, and as this thread is double, and joined together throughout its length, each bag will be found to contain a thousand ells of silk, though the whole weight does not exceed two grains and a half.

The life of this insect in its vermiform state is very short, and it passes through different states till it gradually arrives at its greatest degree of perfection. When it first emerges from the egg, it is extremely small, perfectly black, and its head of a still brighter black than the rest of its body: in a few days it begins to grow white, or of an ash colour; its coat becomes dirty and ruffled: it casts it off, and appears in a new dress; it becomes larger and much whiter, though a little tinged with green, from feeding upon green leaves. After a few more days, the number of which varies according to the degree of heat and quality of its nourishment, it ceases to eat, and sleeps for nearly two days; it then agitates and frets itself extremely, becoming red with the efforts it makes; its skin wrinkles and shrivels up, it throws it off a second time, and gets rid of it with its feet. Thus within the space of three weeks or a month we see it fresh dressed three times. It now begins to eat again, and might be taken for a different creature, so much is the appearance of its head, colour, and figure altered.

After continuing to eat for some days, it falls again into a lethargic state; on recovering from which it once more changes its coat, which makes the third since it issued from its shell. It continues to eat for some time, then entirely ceasing to take any nutriment, prepares for itself a retreat, and draws out a silken thread, which it wraps round its body in the same manner as we might wind thread round an oval piece of wood. It remains quietly in the bag it has formed, and at the end of fifteen days would pierce it to issue forth, if it be not killed by being exposed to the heat of the sun, or shut up in an oven. The silk-cones are thrown into warm water, and stirred about with birch twigs to draw out the heads or beginning of the threads and the silk is afterward wound upon reels made for the purpose.

Thus we are indebted to this little insect for great luxury in clothing: a reflection which ought to humble our pride, for how can we be vain of the silkw hich covers us, when we reflect to whom we are indebted for it, and how little we are instrumental in the formation of those beauties in our clothing of which we are vain?

Thus we find the most insignificant and despicable objects are the instruments of ornament and advantage to man; an insect that we scarcely condescend to look at becomes a blessing to thousands of human beings, and forms an important article of trade, and a great source of riches. Let us then, instead of passing our days in the routine of indolence and luxurious dissipation, imitate the industrious silk-worm, and endeavour, by the unremitting and assiduous cultivation of our faculties, to render ourselves useful to mankind; and if we are neither able nor fortunate enough to discover some new truth, let us at least attempt to make all within the circle of our influence happy and contented by our generous exertions for their welfare.

JULY IV.

The Rainbow.

When the rays of the sun strike upon drops of water falling from the clouds, and we are so placed that our backs are towards the sun, and the clouds before us, we observe a peculiar phenomenon in the heavens, called a Rainbow. The drops of rain may be considered as small transparent globules upon which the rays fall, and are twice refracted and once reflected. Hence proceed the different colours of the rainbow: they are seven in number, and appear in the following order; red, orange, yellow, green, blue, indigo, and violet. These colours appear the more vivid as the clouds which are behind are darker, and the drops of rain fall closer. The drops falling continually produce a new rainbow every moment, and as each spectator observes it from a particular situation, it happens that scarcely two men, strictly speaking, see the same rainbow; and this meteorous appearance can only last whilst the drops of rain continue to fall.

If we consider the rainbow merely as a phenomenon of nature, it presents one of the most beautiful spectacles we can possibly conceive, and is one of the most magnificent of nature's pictures; but when we recollect that God has made this meteor a sign of his mercy, and the conformation of his holy covenant vouchsafed to mankind, we may make it the subject of a most edifying, as well as pleasing, reflection. When the rain descends from one extremity of the horizon to the other we cannot see a rainbow, because to form this meteor the sun must appear at the same time with the rain: and when the sky is only covered with clouds on one side, and the sun appears on the other, it is a sign that these clouds will soon disperse, and that the sky will become clear and serene; this also is the reason why we cannot see the rainbow unless the sun is behind, and the watery cloud before us. In order to form the rainbow, then, the sun and the rain must both be present at the same time: we may therefore rest assured, every time we witness this beautiful phenomenon, that we are safe from the inundation of a deluge; for to effect this, the rain must descend in torrents from all parts of the heavens, and if this happened, the sun could not be seen. We could not see the colours of the rainbow if the sky was too clear: to produce such an effect, a part of the horizon must be covered with thick clouds.

All these considerations naturally dispose our minds to pious reflections. As often as we see the Heavens adorned with the beautiful colours of the rainbow, we may truly say, How great is the majesty of God! How wonderful his goodness towards his creatures! we still see that He remembers us in mercy. Let us then bow before, and adore Him who keeps his covenant, and fulfils all his merciful promises; blessed be his name through all the ages of eternity!

JULY V.

Birds' Nests.

THE construction of birds' nests shows us many curious objects, which cannot be uninteresting to the reflecting mind. Who can help admiring those little regular edifices composed of so many different materials, collected and arranged with so much pains and skill; and constructed with so much industry, elegance, and neatness, with no other tools than a bill and two feet? That men can erect great buildings, according to certain rules of art, is not surprising, when we consider that they enjoy the reasoning faculty, and that they possess tools and instruments of various kinds to facilitate their work; but that a delicate little bird, in want of almost every thing necessary for such an undertaking, with only its bill and claws, should know how to combine so much skill, regularity of form, and solidity of structure, in forming its nest, is truly wonderful, and never enough to be admired. We shall therefore consider it more minutely.

Nothing is more curious than the nest of a goldfinch. The inside is lined with cotton, wool, and fine silky threads, while the outside is interwoven with thick moss; and that the nest may be less remarkable, and less exposed to the eye of observers, the colour of the moss resembles that of the bark of the tree or of the hedge where the nest is built. In some nests the hair, the down, and the straws, are curiously laid across each other, and interwoven together. There are others, all the parts of which are neatly joined and fastened together by a thread which the bird makes with flax, and horse or cow-hair, and often of spiders webs. Other birds, as the blackbird and the lapwing, after having built their nest, plaster the outside with a thin coating of mortar, which cements and binds together all the lower parts, and which, with the help of some cow-hair or moss stuck to it whilst the plaster is wet, keeps it compact and warm. The nests of swallows are differently constructed from all others. They use neither sticks, straws, nor flax; but they compose a sort of cement, with which they make themselves nests, perfectly neat, secure, and convenient. To moisten the dust of which they form their nest, they frequently skim over the surface of some lake or river, and, dipping their breasts into the water, shake their wet feathers upon the dust till it is sufficiently moist, and then knead it up into a kind of clay with their bills.

But the nests most worthy of our admiration are those of certain Indian birds, which suspend them with great art from the branches of trees, that they may be secure from the pursuit of several animals and insects. In general, each species of birds has a peculiar mode of placing its nest: some build them on houses, others in trees, some in the grass, others in the ground; and always in that way which is most adapted for their safety, the rearing their young, and the preservation of their species.

Such is the wonderful instinct of birds in the structure and disposition of their nests, that we may almost conclude they cannot be mere machines; so much industry, intelligence, sagacity, and skill, do they display in the construction of their nests. And is it not apparent that in all their works they propose to them-

[illegible] certain ends. They make their nests hollow, [illegible] that they may be bet- [illegible] nest is covered by [illegible] coarse, not only to serve as a foundation, but [illegible] the wind and insects from [illegible]. The inside is lined with the most delicate materials, such as wool and feathers, that the nestlings may be soft and warm.

Is it not something nearly approaching to reason which teaches the bird to place its nest in such a manner that it is sheltered from rain, and out of the reach of [illegible] animals? Where have they learnt that they are to produce eggs which will require a nest to protect them from being broken, and to keep them warm? That the heat would not be sufficiently concentrated if the nest were larger, and that, if it were smaller, all the young ones could not be contained in it? Who has taught them not to mistake the time, and to calculate so exactly that the eggs are not laid before the nest is finished? These questions have never been satisfactorily answered. Neither can this mystery in nature be clearly explained; all we can do is to refer it to an instinct which some animals seem to possess in a manner almost equal to reason; and instinct to them is much more happy and beneficial than reason would be; for they seem to enjoy all the sweets of life without their moments being embittered by the consideration of their inferior rank in the creation, and without the pain of anticipating evil.

JULY VII.

Diversity of Pleasures in Nature.

[illegible] whatever part of the creation we direct our view we find something to interest and gratify either our

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senses, our imagination, or our reason. Universal nature is formed to present us with a multitude of pleasing objects, and to procure those new and varied delights which continually succeed each other. Our inclination for variety is continually excited and always gratified; there is no part of the day in which we do not find some gratification for our senses or for our minds. Whilst the sun illumines the horizon, plants, animals, and a thousand pleasing objects, gratify our view; and when night extends her sable mantle over the earth, the majestic grandeur of the firmament occasions rapture and astonishment. Every whêre Nature works to procure us new enjoyment; even the smallest insects, leaves, and grains of sand, offer subjects of admiration: and he who is not struck with this infinite diversity, and does not acknowledge in it the goodness of God, must be blind indeed, and little are his feelings to be envied whose heart does not throb with pleasure at the sight of nature's beautiful objects.

The same brook that waters the valleys, murmurs sweet music in our ear, invites us to soft repose, and refreshes the parched tongue. The grove which shields us from the piercing rays of the sun by its protecting shade, makes us experience a delicious coolness; reclining at ease beneath the lofty trees, whilst we listen to the joyful songs of the birds, a thousand sweet sensations soothe our souls. The trees, whose beautiful blossoms so lately delighted us, will soon produce the most delicious fruits, and the meadows, waving with the ripening corn, promise an abundant harvest.

Nature presents us with no objects pleasing and useful in only one respect: she clothes and adorns the earth with green, a colour the most beneficial and agreeable to the eye, and adds to its beauty by diversifying its shades; for, though pleasing in itself, its charms are much increased by this happy distribution of shade. Each species of plant has its peculiar colour; landscapes covered with woods, bushes, plants, vegetables, and corn, present a most beautiful scene of verdure, where the colouring is infinitely varied, and its shades insensibly blended, increasing from the lightest tints to the darkest hue; and yet a perfect harmony is always preserved.

Every month of the year brings us different plants and new flowers. Those which are decayed are replaced by others, and by thus succeeding each other there is no perceptible void in the vegetable kingdom.

But to whom are we indebted for these numerous and diversified presents? Who is it that provides for our wants and pleasures with so much goodness and munificence? Go and ask universal nature: the hills and the valleys will inform thee, the earth will teach thee, and the heaven is a mirror in which thou mayest behold the Author of these blessings. The storm and the tempest announce him; the voice of thunder and the fire of lightning, the bow painted in the heaven the rain and the snow, proclaim his wisdom and goodness. The green meadows, the fields yellow with the ripe grain, the mountains whose lofty summits are lost in the clouds, the trees bending with fruit, gardens variegated with flowers, and the rose's delicious bloom, all bear the stamp of His impression. The birds celebrate him in their melodious concerts: the sportive lambs; the stag, bounding through the forests; the worm that crawls in the dust: the ocean-monarch, the huge whale, that with its gambols sinks ships, and tumbling in the foam makes the waves roar; the fearful crocodile; the elephant, that carries towers upon its back; all the animals that people the air, the earth, and the sea, declare the glory and proclaim the existence of Almighty God. Let us then open our ears to this universal voice of nature, which speaks a language we cannot resist; and let us, that are the happy witnesses of these wonders of God, come and render unto him, in the presence of his creatures, that testimony of gratitude and adoration which is due to him for so many blessings.

We cannot look around but every thing reminds us of his infinite goodness, and calls forth our gratitude and joy: when we walk abroad into the fields, and see the rich corn, the flocks feeding, and the verdant groves, may our souls be filled with pleasure, and our hearts rejoice in bliss! We shall then experience that there is no greater and more durable satisfaction than that arising from the contemplation of Nature's works, which the longer we consider, the more we shall admire; and the more attentively we observe, the more shall we discover that God is a pure being, who loves mercy and goodness, and that the Christian religion is a source of unfading joy, and a continual motive for perpetual adoration.

JULY VII.

A Flower Garden.

Let us now take a view of the Flower Garden, and consider the numerous and varied beauties which are collected in so small a space. The art and industry of man have made it the receptacle of the most beautiful flowers. But what would it have been without care and industry? A wild desert, full of thorns and weeds. And such would be the condition of our youth, if their education were neglected, and their minds remained uncultivated. But when children early receive instruction, and imbibe good principles, they are like sweet blossoms, delightful in beauty, and soon productive of fruit that will benefit society.

Observe the night-violet or julian flower, which towards evening perfumes the garden with its fragrance, in which it excels all other flowers; but it has no beauty, and has scarcely even the resemblance of a flower; it is small and of a grey colour, approaching towards green, so as to be scarcely distinguished from the leaves; humble and modest, it scents the whole garden, though it is not perceived in the multitude; and it is almost incredible that a flower of such insignificant appearance should give out odours so exquisitely sweet. It may be said to resemble a person who is not handsome, but whose want of beauty nature has more than compensated by a ready wit and enlarged mind. The pious man often does good in silence and privacy, and the sweet incense of his good works ascends all round him; and when we become acquainted with this amiable character, we perhaps find him neither distinguished by elegance of person nor elevation of rank.

The carnation combines both beauty and fragrance, and is one of the most perfect of flowers; in the richness and beauty of its colours it approaches the tulip, and surpasses it in the number of its leaves and in the elegance of its form. This flower is the emblem of a person in whom sense and beauty are united, and who has the happiness to conciliate the love and respect of his fellow-creatures.

Let us next observe the rose: its colour, form, and perfume, all charm us; but its beauty soon fades, and the attractions which distinguish it from other flowers soon cease. This is a useful lesson to those who pride themselves upon beauty only; from the short-lived honours of the rose, let them take warning how frail and perishing are the charms of person and the elegance of form. "All is vanity; all flesh is as grass, and all the glory of man as the flower of the field; the grass withereth, and the flower fadeth away." The lilies and the roses of a beautiful face fade like the flowers of the garden, and death leaves no trace of them behind. Let us then be wise enough to seek our happiness and repose from more certain and durable sources. Wisdom, virtue, and the blessings of Christianity, never fade, and are never exhausted; they are the eternal fountains of joy whose waters shall refresh when every other source is dried up.

JULY VIII.

Phenomena of a Thunder-Storm.

However terrible the effects of storms and of thunder may be, they present a spectacle so grand and astonishing that they claim our most earnest consideration. An examination into their nature and effects is the more necessary, because it often happens that an excessive fear prevents our considering this grand and awful spectacle with sufficient attention.

When a stormy cloud or collection of vapours highly electrified approaches so near a high building, or a cloud which is not electrified, that an electric spark escapes from it, an explosion takes place which is called a clap of thunder; and the vivid light that we see is lightning. Sometimes we only see a sudden and momentary flash; at other times a train of fire shoots through the heavens in a forked or zig-zag form. The explosion which accompanies the lightning demonstrates that the vapours which occasion the thunder, becoming suddenly ignited, violently agitate and expand the air, with the emission of each electric spark an explosion is heard, and the thunder is sometimes composed of several claps, or is prolonged and multiplied by echo.

There is generally some interval of time between the lightning and the thunder-clap, and this enables us to judge of the degree and nearness of the danger; for sound requires some time to reach our ear, while light passes so rapidly, that, travelling through the same space, it strikes upon our organs of vision much sooner. As soon therefore as we see a flash of lightning, we have only to count the seconds that intervene before we hear the thunder; or if we have not a watch we may count how many times our pulse beats between the clap and the flash; if we can reckon ten, we are certain that the thunder is distant a quarter of a league; for about forty pulsations may be felt whilst the sound travels the space of one league.*

Lightning does not always proceed in a right line from above downwards, but often in a serpentine or zig-zag direction, and sometimes does not flash till very near the ground. The electric matter which reaches the earth, or takes fire near it, never fails to strike: but it has not always force enough to reach us, and, like an ill-charged bomb, is spent in the air without doing any injury: but when the combustible vapours reach the ground, they often occasion great damage. However, as uncultivated tracts of land, deserts, and places where there are no habitations, form the greatest part of the globe, the thunder may often peal, and the lightning's flash pierce the earth, void of harm. The course of lightning is very singular and uncertain, and depends upon the direction of the wind, the quantity of exhalations, and various other causes. It passes wherever it meets with combustible matter, as when gunpowder is lighted, the flame runs along the course of the train, firing every thing in its way.

We may judge of the force of the lightning by the astonishing effects it produces: such is the ardency of the flame that it consumes all combustible bodies; it even melts metals, but often spares the substances contained in them when they are sufficiently porous to admit of a free passage through them. It is owing to the amazing velocity of the lightning that the bones of animals are sometimes calcined without the flesh being at all injured; and the strongest buildings are thrown down, the trees torn up by the roots, or cleft, the thickest walls overturned, and stones and rocks broken and reduced to powder. To the sudden rarefaction and violent agitation of the air, produced by the intense heat and velocity of the lightning, may be attributed the death of those animals that are found suffocated without any appearance of having been struck by lightning.

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* Perhaps it may assist those who are not accustomed to this kind of calculation to be aware that sound passes about one thousand feet in one second of time; so that if twenty seconds can be counted between the clap and the flash, the place where the thunder is generated is distant twenty thousand feet.—E.

Let us then meditate in silence upon the awful and sublime appearance of a storm; when we see the black clouds gather, and the sun withdraw his light, as if to hide himself from the contending elements, let us remember it is the Lord Omnipotent "who bows the heavens, and comes down with darkness under his feet." The winds rush from the four corners of heaven, and the storm thickens; but God himself is in the whirlwind, and "walketh upon the wings of the wind." At his command the clouds retire, and the thunder and red lightning disperse. "Hearken attentively to the sound of his voice, to the terrible sound that goeth out of his mouth. He directed it under the whole heaven, and darts his lightning unto the ends of the earth." But though his countenance be lifted up in wrath, and his storms strike terror into a guilty world, his beneficent hand is mercifully extended to all who prefer the sweets of religion, and the purity of innocence, to the empty and insignificant pursuits of thoughtless folly, or the more baneful practice of iniquity and continued dissipation.

JULY IX.

The Ants.

The ants, as well as the bees, may be considered as a little commonwealth, having a peculiar government, laws and police. They live in a sort of town, divided into various streets, which lead to as many magazines. Their industry and activity in collecting and using the materials which they want for their habitation is admirable. They all unite together to dig the earth and carry it away from their retreat; they collect a great quantity of grass, straw, sticks, &c. with which they form a heap, that at first seems very irregularly constructed, but a closer examination discovers much art and skill. Beneath the domes or little hillocks that cover them, and which are always so contrived as to throw off the water, there are passages which communicate together, and may be considered as the streets of their little city.

But what is still more remarkable, is the care which the ants take of their eggs; they convey them with the utmost solicitude from place to place, nourish their young, and remove with the tenderest anxiety every thing that might hurt them. Their painful toils to procure provisions during the summer are chiefly for the preservation of their young; for the ants themselves require no food during the winter, being nearly in a state of insensibility or sleep till the return of the spring. As soon as their young come out of the eggs, the ants are busily employed in feeding them, and undergo much labour in the precious charge. They have generally several habitations, and they transport their young from one to any other they may wish to people. According as the weather is cold or hot, wet or dry, they bring their chrysals nearer to the surface of the earth, or remove them farther downward. In mild weather they bring them near the surface; and sometimes after a shower of rain place them where they may receive the warmth of the sun-beams; or after a long drought they lay them in the dew; but as the shades of night deepen, or rain and cold set in, they again take up their little ones, and carry them low down into the earth.

There are several varieties of these insects: the wood-ants inhabit only forests or bushes, and do no harm to the fields; of these there are two species, one red, the other black. Some of them settle in the ground, in dry soils, generally choosing those places where they find roots of fir trees or birch. Others inhabit old trunks of trees above ground, and sufficiently high to be out of the reach of its moisture; they make themselves apartments in the cavities of the trunk, and cover them with straw and other materials to shelter them from snow and rain.

The field-ants are also red or black, like the others, but they are smaller in size; they either live among the corn or in the soil of the field. When the weather is dry they bury themselves pretty deep; but as soon as it becomes rainy, they raise their habitations, according as there is more or less moisture, and when it diminishes they return to their subterranean dwellings. Ants are also furnished with wings, and towards the autumn they are seen to fly in swarms over ditches and ponds.

Some people may perhaps think that these mischievous ants can deserve no portion of our attention, when they do so much injury to our fields, by their subterranean works making the ground hollow, and preventing vegetables from growing. Other complaints are also alleged against them; they are enemies to bees and silk-worms, and are supposed to injure flowers and young trees. Hence the ants are generally exterminated whenever they are found. But whatever are their powers of doing mischief, they certainly, as a link of the great chain of animal nature, claim our attention, and are worthy of our observation. They supply various birds with food, and afford a very useful example of industry, whilst their parental affection for their little ones is highly worthy of imitation. Thus we still find that every work of God is excellent and worthy of our admiration, however insignificant or injurious upon a superficial examination they may appear. "The supreme Creator, by whom all things exist, has created nothing without design, nothing that has not its particular use and destination. The trees have not a leaf, the fields a single blade of grass, nor the flowers a stamen, that is useless."

JULY X.

Hail.

HAIL is nothing more than drops of rain, which, being congealed in the air, fall in a spherical, oblong, or angular form. Should it seem strange that vapours freeze in the atmosphere during the warmest season of the year, we must consider that even at the time of the greatest heat, the upper region of the atmosphere is very cold. If this were not the case, how could the highest mountains remain covered with snow during the summer? In the hottest regions of America it is so cold on the top of very high mountains, that there is a danger of being frozen, if any one is so adventurous as to climb their lofty summits; and we should have snow in the middle of summer, if it did not melt during its fall before it arrived at the ground. When the particles of snow unite, the drops begin to congeal; and as during their descent they pass suddenly through warmer regions of air, before the increase of temperature has had time to operate, they are completely frozen.

'It might on the contrary be supposed, that the cold would diminish in proportion as they pass through warmer air; but what takes place in winter, when cold water which has been exposed to the open air is brought into a warm room? It freezes and becomes ice, which would not have been the case if it had been taken into a cold room.' And this is exactly the case with hail: When cold bodies suddenly pass into a warm medium, their cold augments to such a degree that they are converted into ice. Saline particles diffused through the atmosphere contribute to this effect? hence we must not be surprised that storms are not always accompanied with hail; for to produce it, a quantity of saline vapours is necessary to occasion the drops of water to freeze more instantaneously. Though hail is more frequent in summer, it falls also in the other seasons; for as saline exhalations exist in every season of the year, there may be hail in winter, spring, or autumn, as well as in summer

The size and form of hail are not always alike; hail-stones are sometimes round, at others concave and half spherical, and often conical and angular; their usual size is that of small shot, though sometimes they are much larger. This difference in their figure and bulk may depend upon accidental causes, such as winds, especially those which are boisterous: and a particle of hail may meet in its fall with substances with which it unites, and thus its volume become increased: and sometimes several small particles unite and form one large hail-stone.

When the hail is of a very large size, it often causes immense damage to the harvest, fruits, vines, and buildings. But this by no means entitles us to consider it as a curse or a judgment of God; for if the violence of this meteor sometimes lays waste our fields, and breaks our windows, the ravages it occasions are nothing in comparison of the advantages which it produces. It cools the air during the fervent summer heats, and when it dissolves fertilises the earth: hence we have no reason to fear its falling from the clouds, but should rather consider its beneficial consequences, and glorify that heavenly Being who, in the midst of hail and of storms, still worketh our good, and provideth for our felicity.

JULY XI.

The Utility of Storms.

WE ought always to consider the phenomena of nature in such a light as to impress upon our minds the wisdom and goodness of God; and this duty is the more indispensable, because it is often neglected by inattentive, ignorant, and ungrateful people. It is true that God sometimes makes use of natural phenomena to punish the sins of man; but these particular instances do not disprove that he always proposes and has in view the general welfare of all; and of this, nature furnishes us with abundant examples and incontestable proofs. In this day's reflection we will confine our attention to a single phenomenon, which is particnlarly suited to convince us of the above proposition, and upon which our ideas ought to be very clear.

Are not the greater part of mankind accustomed from early infancy to pronounce the words thunder and lightning with terror? Such is our injustice, that we only think of the extremely rare cases in which storms are fatal to a very small part of the universe; whilst we shut our eyes to the great advantages which result from them to the totality of mankind. We are not able to enumerate all the benefits we derive from storms; but the few that we are acquainted with will suffice to fill our hearts with gratitude for our heavenly benefactor.

Let us present to our minds the idea of an atmosphere charged with noxious and pestilential vapours, which become more and more dense by the continual evaporation from earthly substances, of which many are putrescent and poisonous: this air we are under the necessity of breathing; the preservation or the destruction of our existence depends upon it; and thus the salubrity or insalubrity of the air dispenses life or death. Most of us have experienced a state of great oppression and languor during the stifling heat of summer; when our respiration is difficult, and we labour under great uneasiness and anxiety. Must it not then be considered as a great blessing of God, and deserving of our warmest gratitude, that a salutary storm arises and purifies the air of its noxious properties; kindles the sulphureous particles, and thus prevents their dangerous effects; cools the air, and by restoring its elasticity facilitates respiration.

Without an occasional storm the impure exhalations would be more and more increased and prejudicial; animals would perish by thousands, and an universal plague would desolate the earth. Which then is the most rational, to rejoice or repine at the presence of storms? To murmur at the slight damage they sometimes occasion, or to bless the Almighty for the precious advantages they procure to the world? Besides, not only men and animals derive much benefit from the atmosphere being purified from its noxious vapours, but it is also highly advantageous to vegetables. Experience teaches us that the rain which falls during a thunder-storm is productive of the greatest fertility to the earth. The saline and sulphureous particles which fill the atmosphere during a storm are drawn down by the rain, and become an excellent source of nourishment to plants; to say nothing of the immense multitude of little worms, seeds, and insects, which are forced into the earth by the rain, and which by the assistance of a microscope, may be easily discovered in the drops of water.

Reflections like these may perhaps tend to moderate the excessive fear some people have of thunder, a fear which denotes the little confidence they place in God. Instead of suffering a storm to possess our mind with terrific and fearful ideas, let us rather accustom ourselves to consider it as an object of grandeur and sublimity; instead of regarding the accidents caused by thunder, let us only observe the necessity and great utility of storms; and, instead of praying the Almighty to withhold the tempest, let us beseech him to suffer it from time to time to descend upon the earth, or let us rather entirely rely upon the mercy and goodness of Him who rules over the universe in wisdom, and knows what is best for us. Every time the storm shall lour and the thunder peal, let us say from our hearts, in the fulness of our confidence: Almighty God! it is thou who commandest the elements, and directest the lightning; we are in thy hands; thou alone canst save; thou only canst destroy. At thy word, the storm shall desolate our fields, or make them fruitful. Thou alone art great, and thy power is inexpressible: but we are thy weak and helpless children, and thou art to us a Father of mercy and love; and when thy voice is heard in thunder, and thy countenance seen in the winged lightning, it is still for our good. Blessed for ever be thy holy name: let all the ends of the earth raise one universal Hallelujah, the music of which shall be heard in heaven!

JULY XII.

Of the Earth, and its primitive Constitution.

The earth is so constituted as to be fit for the production and growth of herbs, plants, and trees. It is sufficiently compact for vegetables to grow in it, so firm that the wind does not blow them down; and yet it is so light and moveable that plants may put forth their roots in it, and attract humidity and nutritive juices. Whenever the surface of the earth is dry and parched, its lightness facilitates the rising of the juices in the capillary vessels to provide plants with their necessary support Besides this, the earth is full of different kinds of juices, which tend to promote the growth of plants; and that every species of vegetables may flourish, we find there are different sorts of earth, which answer different purposes; such as potters' earth, argillaceous, calcareous, &c. Some are used to make bricks, others to construct buildings, and form earthenware and porcelain, and some are used to dye colours, and for medicine.*

The inequalities on the earth's surface are of great utility: many plants and animals inhabit the mountains; and these lofty eminences also serve to break the violence of the winds, and produce a great variety of plants and wholesome fruits which would not thrive in the valleys or on the plains; they contain useful metals and fossils, and from them proceed the sources of many rivers produced by the melting of the snow, by rains, and different watery exhalations. The stones which are in the earth serve to build walls and make glass. The uses of metals are extremely various; we need only consider the many tools they furnish to our workmen and artists, the numerous utensils and the furniture that are made of them, and the many ornaments and conveniences we derive from them. We also obtain great advantages from the solidity and weight of these bodies.

The great utility of minerals is generally known.

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* The different earths at present known are ten; barytes, strontian, lime, magnesia, alumina, yttria, glucina, zirconia, agustina, and silica.—E.

Volcanoes and earthquakes, however they may sometimes devastate a country, are useful and necessary; and we must impute it to our ignorance if there are many things whose use we cannot discover. When we see certain phenomena in nature which are sometimes prejudicial, we should always remember that God only permits them to happen for the perfection and good of the whole; and rightly to judge of his works, we must not consider them partially, but take a wide and extensive survey of all the parts of a whole, and examine them both separately and combined. We shall then find that many things which we thought were injurious, are on the contrary of an incontestable utility; and others which appear superfluous, we should find to be necessary to the perfection of the whole, and their removal would occasion a chasm in the empire of nature. How many things are there which appear to us insignificant and of little worth, because from our ignorance we are not acquainted with their use and true worth? Give a magnet to a man unacquainted with its virtue, and he will disregard it entirely, or consider it with indifference; but inform him that by means of this little instrument the greatest quarter of the globe was discovered, and that men securely traverse the ocean with no other guide, his opinion will immediately change, and he will prize as much as he before contemned it. And this instance is applicable to thousands of cases, where we despise the means because we are ignorant of the end, where we disregard the object because we do not know its use. Lord! the earth is full of thy goodness; all is arranged with wisdom! May we consider it as our chief duty to apply ourselves more and more to know thee; and to pay thee that just tribute of gratitude and love, which we owe thee for the various blessings we derive from the earth.

JULY XIII.

Phases of the Moon.

It has been ascertained by attentive observation that the moon has a peculiar motion round the earth from west to east; for after having been between our earth and the sun, she retires from under that body, and continues to fall back towards the east, changing from day to day her place of rising. In fifteen days she will have reached the most eastern extremity of the horizon, at the time we see the sun set; she is then said to be in opposition: in the evening when the sun retires, she rises above our horizon; and sets in the morning as the sun rises. If she then continues to traverse the circle which she has begun round the earth, and the half of which she has accomplished, she will visibly remove more from her point of opposition with the sun, and will gradually approach nearer to him; we shall then see her later than when in opposition, till by degrees she will only be seen a little before sun-rise. This revolution of the moon round the earth explains why she rises and sets at different times, and why her phases are so diverse and yet so regular. Nobody is ignorant that a globe illuminated by the sun, or by a torch, can only receive its light immediately upon one side. We are readily convinced that the moon is a sphere which receives its light from the sun; when therefore she is in conjunction, that is, placed between the sun and us, her illuminated half is turned towards him, and her dark part towards us, consequently at that time she is invisible to us: she then rises and sets with the sun in the same regions of the sky, and is called the new moon, or the conjunction. But when the moon retires from under the sun, and passes back towards the east, her dark side is not then entirely turned toward us: a small portion, a slight border, of the illuminated disk comes in view: and we see this luminous border upon the right, near the setting sun; and the horns of this crescent turn towards the left, or facing the east. As the moon removes farther from the sun, she becomes more visible, and at the end of seven days, when arrived at a quarter of her course round the earth, she displays more and more of her illuminated side, till at length we see the half of it. The luminous part is then turned towards the sun, and the dark part reflects no light upon us. This luminous part is exactly half the lunar sphere: the half of this half is then a quarter of the whole sphere, and it is in reality this quarter which we see; and the moon is then said to be in her first quarter.

In proportion as the moon becomes more distant from the sun, and the earth advances between them, a greater surface of that part of the moon which is directed towards us becomes luminous. At the end of seven days, reckoning from the first quarter, she is nearly in opposition with the sun, and her whole disk is illumined and visible to us. She then rises in the east precisely at the time the sun sets in the west, and we have a full moon. As early as the next day, the enlightened half is turned a little from us, and we no longer see the moon at the full. The light gradually leaves the western side, extending itself to the half which is turned from the earth: this is the decrease of the moon, and the farther she advances forward, the more her dark part increases, till at length half of it is turned towards the earth, and consequently half her luminous side. she has then the form of a semi-circle, and is in her last quarter.

By the admirable harmony which subsists between the revolution of this planet upon its axis, and its course round the sun, it happens that the moon always presents to us the same half-sphere that she has shown from her first creation. During the lapse of so many ages, she has, in one regular and constant course, completed her revolution in twenty-seven days and eight hours. Regularly and at the same periods, she has enlightened at one time our nights, and at another those of more distant climates.

From the revolutions of the moon, let us turn our attention to those of terrestrial objects. Sometimes health, pleasure, and affluence, with a thousand other advantages, concur to render us happy, and a luminous tract marks our progress through life. But a reverse happens; and ere the sun that rose upon us in the morning with joy and gladness, sinks beneath the western ocean, our light is obscured, and nought remains but the bitter remembrance of departed pleasures; hope no more gilds our bosom, and all our thoughts are turned to sorrow. Yet this change is highly useful to the mind; it teaches us the uncertainty of worldly blessings, softens and ameliorates our hearts, and raises in our souls a fond desire after that happy country where the free mind shall rejoice in its existence, and live for ever increasing in purity and all perfection.

JULY XIV.

Mineral Waters.

Whether we consider mineral waters in respect to their formation, or to their utility to man, they are doubtless highly valuable and important. But men are generally too inattentive to such subjects; and the places where these sources of life and health flow in abundance, are often the scenes of very different occupations than those of singing praises to the Creator, and pouring forth the sentiments of gratitude for such choice blessings.

The sources of common salt are richly deserving of our attention; it is probable that they owe their origin to the mineral salt which the waters dissolve on the earth. The mineral hot springs are equally remarkable. They are very numerous; and the water of some of them is so hot, that they require several hours to become cool enough to be used as a bath. It is a curious question, whence their heat is derived? It cannot be from the sun, because in that case the waters would only be hot in the day time, whilst exposed to the sun-beams; and they would become cooler on the approach of night, and during the winter. The most natural solution of this question is, that the waters by passing through soils containing sulphureous, pyritic, and metallic substances, acquire their great degree of heat. Medicinal waters, particularly those which are acidulous, are produced by dissolving and mixing with the minerals that they pass over. They are generally found in places where there is abundance of iron, copper, sulphur, and carbon. Hence their taste and effects are various, according as they are more or less impregnated with these bodies. They are bitter when they contain the juices of bitter roots, salts, and copper; they are cold when impregnated with sal ammoniac, nitre, alum, &c. or when they issue from the bed of a rock. Unctuous and bituminous substances impart to them a degree of oiliness; and sulphur combined with an acid renders them sulphureous. Let us then admire the inexhaustible riches of that Divine goodness which has prepared for the benefit of man so many unfailing sources of health. Mineral waters may answer many other purposes, but certainly their great and chief use is the preservation and health of man. Let us then, and more particularly those who have experienced the salubrious effects of these springs, rejoice and be thankful for the numerous blessings of Heaven: and you that are able, endeavour to imitate the purest of all Beings, by making your riches the sources of life and consolation to the needy and afflicted children of poverty.

JULY XV.

Continual Activity of Nature in the Vegetable Kingdom.

WHOEVER is desirous of knowing why Nature is never idle throughout the year, need only consider the numerous advantages that result from her constant activity. The vegetable kingdom supplies animals with a great part of their food, and affords the mind pleasure by its great diversity. The beneficent Creator ordered that nature should contribute to the pleasure as well as the support of man; hence plants do not appear all at once, but in a certain succession; for if this was not the case, they could not produce such beneficial consequences. How would men be able to secure their harvests, if all fruits arrived at maturity in the same season? And what would become of many millions of animals that had not the means of laying up stores? How could the numerous species of insects that live upon flowers exist, if they all grew at the same time, and lived but for a month or two? For though many insects cannot be found during winter, they still live in a torpid state, and come forth as soon as the returning warmth renders them lively.

It is then very clear, that if nature was differently arranged, both men and animals would materially suffer, if not entirely perish; and we may justly conclude that it is for their preservation that nature operates with such a constant activity in the vegetable kingdom.

If we reflect upon the pleasures of vision and of smell, which men so eminently enjoy, we shall also find that to promote these it was necessary that nature should have her present arrangement. It was not only requisite that she should display her flowers in all their beauty, but also that she should afford a constant supply throughout the year, that our enjoyment might never cease. In spring, when we go forth into the country to contemplate the different productions that are growing up for our future nourishment, we see the young buds and the trees gradually unfolding their beauties. As summer advances, and the tender corn begins to shoot into ear, a thousand beautiful flowers mingle their charms in a sweet succession of varied gaiety; and at length when the wintery blast blows cold, and makes the fire-side comfortable, nature produces other vegetables, which, though not so striking to the sight, are still very useful.

From all this it appears, that the chief design of the Creator in this happy arrangement of nature, is the advantage and well-being of man. Every thing is so admirably regulated that men, as well as other animals, gain an adequate supply of nourishment. Every season brings forth its peculiar flowers and fruits, each appearing in its appointed time: as one gradually decays and perishes, another comes forth in youthful beauty; and the many thousands of plants which we see all follow the same law. Every thing that bears the stamp of God's creation, is formed in the same regular and wise order, though the weakness of our intellect sometimes prevents our discovering their real purpose and design.

Let us then for ever bless our Creator, and render unto him all glory and honour; acknowledging in humble reverence and with grateful hearts, that in all the revolutions which agitate the vast empire of nature, whether in the animal or the vegetable creation, he proposes only our good, and more perfect happiness; and then when we joyfully walk abroad into the flowery meads, and contemplate nature's ever-varying beauties, we shall only breathe the language of gratitude and love, and our souls will approach nearer to the purity and ethereal essence of the all-perfect God.

JULY XVI.

Beauty and Use of Meadows.

The sight of a fine and well cultivated garden, in these summer days, is highly pleasing, and forms a gratification of which those people who remain shut up in their houses can have no conception. But to the true lover of nature, a regular and beautifully disposed garden has no charms equal to those of the valleys smiling in rustic simplicity; the proudly-bearing tulip, the elegant narcissus, and the beauteous hyacinth, must yield to the sweet little flowers that modestly raise their heads amid their native fields. Whilst the former only please by their beauty, these often combine with simple charms an evident utility, which continues to gratify when beauty is no more. Do we not in those long and straight gravel walks, so uniform and neat; in those clumps of trees, those arbours and beds of flowers so regularly formed, and borders neatly cut, with high walls and enclosures surrounding all; feel a degree of confinement that is irksome, and restriction that is unpleasant? Whatever limits our view, seems to set bounds to our liberty, and we long to range abroad in the open fields and meadows, where no dead wall shall obstruct our prospect, nor uniform enclosure pain our sight. In proportion as our range of nature is wide and extensive, our independence seems to increase, and we delight to roam at ease, in careless thought or in musing contemplation.

The beauties of a garden are soon observed, and when their novelty is over, half their charms are lost: the eye becomes weary of surveying the same objects; little pleasure can be derived from continually viewing the uniformity of shrubs ever seen in the same place, or contemplating plants whose variety may be explored in an hour; we pass up one walk and come down another, and if we cannot discover a third, measure back our steps, and are not sorry when we are permitted to retire: whilst in the open campaign the aspect of nature is ever changing, the eye fondly stretches far on the horizon's distant boundary, and when the lawn can no longer be distinguished from the sky, imagination lends her aid, and we dwell with rapture upon a picture which art cannot imitate. Our pleasure is further increased by that inequality of surface which we everywhere observe throughout nature; from the stupendous mountain's crag, where the bleak wind whistles, to the sheltered valley. She is her own gardener, and is never weary with labouring; her seeds and fruits are exhaustless, and her verdure is only interrupted to return with fresher beauty; her streams overflow and renew the parched and drooping herbs, and each of these has a seed, blossom, and beauty, peculiar to itself. For though the same species of herb may be very abundant in every field, we can scarcely step without meeting with a great variety differing in figure and properties, and presenting us not merely with beauty and diversity, but also with very great and indispensable benefits. The fields produce plants for our nourishment when we are well, and for our relief when sick. They also support those animals whose use we could not dispense with: such as the ox, upon which we feed, and whose services are used in agriculture; the horse, whose uses are so numerous and various; and the cow, whose milk is so nourishing. These, with many other useful animals, require nothing more than the grass of the meadow, which demands neither sowing nor labour; its produce is certain, and the farmer has no other trouble than to collect what nature exuberantly gives him.

But it is melancholy to reflect that men are generally too much absorbed in worldly cares, to be attentive or sensible to the bounty of God lavished in nature: they see with indifference the fields clothed with grass;

whether because springing up under their feet, they think it unworthy of notice, or because it grows spontaneously without their assistance. Whatever be the cause of this indifference, it is a reproach to the human character, and deserving of the severest reprehension. Let us then beseech the Almighty Power, to whom we owe all our earthly good and hopes of future bliss, that when we walk forth into the meadows and the valleys, our hearts may be grateful, and softened with the dew of heaven; that when we behold all the beautiful variety of flowers that adorn the fields, we may be more sensible to the goodness of God, who extends his omnipotent arm over the whole creation, showering down his blessings as from a never-failing, never-dying spring, whose silent waters exuberantly pour upon the whole earth.

JULY XVII.

Morning Twilight.

TWILIGHT, like every other phenomenon of nature, is doubtless intended for our benefit. It is nothing more than a prolongation of day, which at one time prepares our eyes to support the brilliancy of day, at another to bear the darkness of night. The twilight is not always the same; it differs according to climate and season. Towards the poles it continues longer than in the torrid zone, where the people see the sun rise directly above the horizon, and dip in the same direction beneath the lower hemisphere; hence they suddenly pass from the light of day into total darkness. Whilst on the contrary, the sun darting his rays obliquely towards the poles, and not descending far below the horizon of the neighbouring people, it happens, that their nights, though long, are almost always accompanied by twilight, and therefore are in some degree luminous.

As for us, who are placed at nearly an equal distance from the inhabitants of the torrid and those of the frigid zone, we plainly observe that the twilight becomes sensibly shorter as the length of the days diminishes, and longer in proportion as they lengthen. In the evening, after the sun sets, we enjoy an hour, and sometimes more, of twilight. This useful arrangement is owing to the atmosphere, which to a certain height every-where surrounds the earth. And such is its nature, that the rays of light that pass through it perpendicularly are not diverted from their straight direction; but when the rays fall obliquely instead of passing in right lines, they bend or are refracted, descending a little lower, in such a manner that the greater number of rays which penetrate the atmosphere on the side of the earth, fall in consequence of this inflection upon it; and thus, instead of passing directly through the air, they are bent by it and directed towards the earth. Thus when the sun approaches our horizon, many of his rays which pass near us in an oblique direction, and which would not reach us, meeting the volume of air which surrounds our earth, become refracted by it, so as to effect our vision in such a way that we see day-light some time before the sun appears.

This law of the refraction of the rays of light in the surrounding mass of air, is a work equally full of wisdom and goodness towards all the people of the earth; and more particularly so to the inhabitants of the frigid zones, who without the blessing of twilight would be for whole months in a state of total darkness. Perhaps this explanation of the origin of twilight may not be sufficiently intelligible to many readers. Recommending such as these to consult the works of more enlightened philosophers for fuller information on the subject, let us conclude with reflecting upon it as rational beings and as Christians. To do this nothing more is requisite than a willing mind and a pure heart, that seeks to glorify the Father of mercy. And the upright man who, however unlettered and deficient in learning, ever finds cause to bless the Creator in his works, is wiser than the philosopher who, intent upon explaining and investigating the phenomena of nature, loses sight of that great Being who created the light and formed the universe.

JULY XVIII

Rural Pleasures.

Come, and let us enjoy those pleasures which are only tasted by the wise. The pure light of the sun invites us into the fields, where an innocent and refined joy awaits us. Let us walk into some flowery valley, and sing a hymn of praise to our Creator.

See the breath of the zephyr gently playing upon yon hawthorn bush: where the little songsters are hopping from bough to bough, their sprightly eyes beaming joy, and their soft melody warbling harmonious love!

Ye tufted groves, ye valleys, and ye mountains, so peculiarly favoured with the gifts of summer, how your view gratifies and delights the pure soul! your attractions owe nothing to art, and they are more excellent than the proudest beauties of the garden.

The yellow grain waves luxuriantly, and invites the sickle of the joyful reaper. The trees crowned with leaves overshadow the hills and the glens: the birds rejoice in their existence; they sing their pleasures, and every note pours forth rapturous joy.

Each year renews the treasures of the peaceful husbandman; freedom and the smile of happiness lighten his serene countenance, that speaks a soul at ease. Remote from the iniquity, the pride, the baseness, and sordid cares, which enslave and render callous the hearts of those who herd together in cities, he rises to inhale the sweet breath of morning, and lies down upon his humble couch at peace with his God, himself, and mankind.

JULY XIX.

Evening Twilight.

The evening twilight is that faint light which after sun-set continues still to illuminate our atmosphere, particularly towards the west. It is partly occasioned by the refraction and reflection of the sun's rays in our atmosphere, and in part by the proper atmosphere of the sun, which is known by the name of zodiacal light, which sometimes appears, particularly in spring, towards the evening, and in autumn towards morning. When the sky is clear, we may see the smallest stars during the twilight; which continues from the time the sun has entirely disappeared till dark night, generally lasting about two hours. In the island of Senegal, where the nights are nearly as long as the days, the twilight only continues a few moments; the interval between sun-set and the darkness of night being scarcely a quarter of an hour. Thus as soon as the sun has sunk from ten to fifteen degrees below the horizon, the whole country is immersed in the profoundest darkness.

In our climate the shortest twilight is about the first of March, and eleventh of October. When the northern declination of the sun is such that he only passes eighteen degrees below the horizon, the twilight continues all night. And this is the reason that in the summer solstice we have in these climates scarcely any night, and in the more northern climates they have no night at all, though the sun is below the horizon. This occurs, when the difference between the depression of the equator, and the northern declination of the sun, is less than eighteen degrees; and takes place in the greater part of Germany from the 17th of May, to the 25th of July.

The advantages which we derive from twilight are very evident. To pass at once from broad day to dark night would be very inconvenient, such a sudden change from light to darkness would hurt the organs of vision. The wise Author of nature has therefore prevented these inconveniences, by giving us an atmosphere which prevents us from losing the light suddenly, although the sun is below the horizon; and thus, by means of the twilight, we pass by insensible degrees from the light of day to the obscurity of night.

JULY XX.

The Ephemeron Fly.

THIS species of insect is named ephemeron, because of its very short existence in the fly state. It is one of the most beautiful species of the small flies, and undergoes five changes. At first the egg contains its vital principle; it then comes forth a small caterpillar,* which is transformed into a chrysalis, then into a nympha, and lastly into a fly, which deposits its eggs upon the surface of water, where the sun's rays bring them to life. Each egg produces a little red worm, which moves in a serpentine manner. They are found in abundance during the summer, in ponds and marshes; and as soon as cold weather sets in, the little worm makes for itself a shell or lodging, where it passes the winter; at the end of which it ceases to be a worm, and enters into its third state, that of a chrysalis. In this state it sleeps till spring, and gradually becomes a beautiful nympha, or a sort of mummy, something in the form of a fish.

At the time of its metamorphosis the nympha appears inactive and lifeless; in six hours the head is visible, raising itself gradually above the surface of the water; the body next disengages itself slowly and by degrees, till at length the whole animal comes out of its shell. The new born fly remains for some minutes motionless upon the water; then gradually revives, and feebly shakes its wings; then moves them quicker, and attempts first to walk, then to fly. As these insects are all hatched nearly at the same time, they are seen in swarms for a few hours flitting and playing upon the surface of the water. The male and female then unite and couple together for two more hours, when they again return to their sports, lay their eggs, and soon after die. Thus they terminate their short life in the space of a few hours, and the same day that saw them born witnesses their death.

From the history of these little creatures we may learn how fallacious are the opinions which we form of our lives in regard to eternity. Let us for a moment imagine, that one of these flies had preserved its life for twelve hours, and had thus arrived at the most advanced age compared with its companions, most of which had died at noon. If this aged insect could speak about sun-set, a little before its death, it might thus address its friends. "I now find that the longest life must terminate. The period of my dissolution is at length arrived, and I regret it not; my very old age is become troublesome, and I can no longer discover any thing new beneath the sun. All that I have seen in the course of my life has convinced me, that nothing here is certain or permanent. I have lived in the first ages of the world; I have conversed with insects far superior to those of the present generation. [illegible]ure you that I have seen this sun, which is now so near the earth, in the midst of the sky. In those days his light was much more vivid than it now is; and our ancestors were much more sober and virtuous than we are. I have outlived my contemporaries, have had large experience, and have witnessed many strange events. My life commenced precisely when the sun rose. During countless years it ran its majestic course through the heavens, and every where diffused an intense heat; but now that it is declining and going to set, I perceive clearly that the end of all things is approaching. O my friends, how I once fondly hoped that my life would be eternal! What beautiful little cells I formed for my abode! What hopes I founded on my vigour, my agility, and the strength of my constitution; I thought my wings would never fail!"

Thus might an insect which has lived nearly twelve hours on the earth moralize. And a man who has passed nearly fourscore years in the world may adopt similar language. The difference between twelve hours and eighty years being nothing in reference to eternity.

JULY XXI.

Diversity of Zones.

The figure of the earth being spherical, and having a double motion, it necessarily follows that its different regions vary from each other, both as to the temperature of the air and the seasons, as well as with regard to the animals and plants which they produce. In certain countries of the globe there is but one season; the summer continuing without cessation, and every day being as warm as the hottest of our summer days. These countries are situated about the middle of the globe, and occupy the space called the torrid zone. The most delicious and odoriferous fruits that nature produces grow there, and there also she has lavished her richest treasures. In this zone the days and the nights are of an equal length during the greatest part of the year.

There are countries, on the contrary, where an intense degree of cold, exceeding that of our severest winters, almost constantly prevails; and it is only during a few weeks out of the whole year that there is heat enough for a few trees and herbs that are found in those regions to grow and become green; but neither the trees nor the earth produce fruits which will nourish man; and in these regions there is the greatest length of day and night, each being of several months duration.

The two temperate zones, situated between the torrid and the frigid zones, occupy the greatest part of our globe. In these countries there are four seasons, more or less distinct according as they approach nearer to the torrid or to the frigid zone. These seasons are, the spring, when the trees and plants put forth their buds, the heat moderate, and the days and nights nearly equal; the summer, during which the fruits of the fields and of the trees are ripened, the heat powerful, and the days sensibly longer than the nights; the autumn, when the fruits and the seeds fall, the grass begins to wither, the heat to diminish, and the days and nights to be equal; the winter, when the vegetation of plants is partially or wholly suspended, the nights are lengthened, and the cold is more or less intense.

The countries of the temperate zones are so situated, that in those which border upon one of the sides of the torrid zone, the seasons occur in an order quite opposite to that which obtains in the other temperate zone; for when it is winter in the one, it is summer in the other. It is in these regions that nature seems to have produced the greatest diversity, both of animal and vegetable productions. Wine is peculiar to those countries, for the vine cannot be cultivated where either the heat or the cold is excessive. The inhabitants of these temperate climates enjoy advantages greater than in any other country; for the people inhabiting the frigid zone are stupid, and of short stature: those of the torrid zone are of a more feeble temperament, have stronger passions, and less intellectual and bodily powers, than the inhabitants of the temperate zones.

However diversified the countries of the globe may be, the Creator has provided, by his wise arrangements, for the happiness of all their inhabitants. He makes each country produce that which is most beneficial and proper, according to the nature of the climate. A worm which feeds upon the leaves of the mulberry tree, spins for the people of the torrid zone a tissue with which they prepare the silken garments which they wear. And a tree, like a shrub, bears a kind of pod or husk, containing a very fine wool, or cotton, with which light stuffs are manufactured. The cold countries abound with quadrupeds, whose skins furnish clothing to the inhabitants of the north, who also enjoy extensive forests which abundantly supply them with fuel. The natives of the south possess in their fields and their orchards the most cooling and exquisite fruits, and in such abundance that they are able to supply other countries with large quantities. In the colder regions the want of fruit is supplied by the numerous fish contained in the seas and the lakes, and by the numerous animals with which the country is inhabited; some of which, roaming wild in the forests, affright the neighbouring inhabitants; and they are still highly valuable for their skins, and many of them as articles of food and convenience.

Thus there is no country of the globe that does not receive proofs of the greatness and goodness of God; no country so poor and sterile as not to furnish its inhabitants with the means of existence and the comforts of life; and we must every where acknowledge the traces of Divine goodness; even the vast trackless deserts and craggy mountains of Asia and Africa declare it, and contain monuments of eternal wisdom and unbounded love. From the frozen climes of the north, where ice and snow for ever dwell, hymns of praise to the most high God rise and blend in harmonious union with the tuneful incense as it ascends to heaven from the more temperate regions. By every tongue, language and people, the name of God is manifested, revered, and joyfully sung; and let us, the inhabitants of a country peculiarly favoured by Heaven, be as distinguished amongst the nations of the earth for piety and good works, as we are for arts, sciences, and commerce.

JULY XXII.

Peculiarities of the Sea.

INSTEAD of looking upon the sea as an object of terror, let us consider the wonders and the benefits which it presents to us. It must be granted that when the waves swell into mountains, and the tempest roars, the prospect is awful; and we must be hardy indeed not to consider it as a more formidable element in such times of fearful visitation, when ships, breaking from their anchors or driven from their course, rush before the winds that beat upon them with ungovernable fury, till dismasted, and their rigging shivered in fragments, they sink overwhelmed with a weight of waters, or strike some sand-bank or shelving rock, and are at once dashed to pieces. Sometimes whirlpools, of vast masses of water with a violently circular motion, whirl the unfortunate vessel that fate urges into their vortex, with irresistible force, till the helpless victim sinks within the tremendous gulph, and the cries of the unfortunate wretches are lost in the roar of the waves. These whirlpools are occasioned by rocks in the ocean, and the meeting of numerous currents and eddies: and not less dangerous are the water-spouts, that the wind raises from the sea to the clouds; they hover in the air high above the ocean, and the wind whirls them round with violence. They often burst with a great crash and much mischief; for they fall upon a vessel, destroy its rigging, and sometimes sink it to the bottom.

But it would be highly ungrateful and unjust only to consider the losses occasioned by the sea, without reflecting upon the magnificent and stupendous works of God, and that goodness which even visits the unfathomable depths of the ocean. The first thing which strikes us upon the investigation of sea-water, is its saltness; a pound of this water containing about two ounces of salt. Sea-salt is lighter than that we commonly use, and yet it is not attracted by the air, nor diminished by the continual influx of fresh water. The cause of the saltness of the sea is unknown. If it was from mountains of salt contained in the ocean, it would be salter in some places than in others, of which we have no proof. But whatever is the occasion of the saline property of the sea, it is absolutely necessary, to accomplish certain ends. It is that which preserves such a vast body of water from corruption, and renders it capable of supporting a greater weight.

The colour of the sea also merits our attention: it is not every-where alike. In all waters the colour of the bottom and that of the sky appear; they are dark in deep abysses, white and foaming during a storm, silvery and gilded with reflections of the most beautiful hues when the last rays of the setting sun play upon the unruffled surface. The colour of the sea, in addition to these, varies, from numberless insects, rine plants, and the combination of the different substances which the rivers and torrents carry with them into the ocean. When it is calm, and not a breeze skims the surface, it sometimes glitters as with the most brilliant stars; and the track of a ship cleaving the waves is often luminous, seeming like a river of fire.

A well-known property of the sea is the ebbing and flowing of the tides*.

The creatures which inhabit the sea are well calculated to excite our surprise and admiration; we there discover a new world, and the number of beings which compose it is prodigious. Aquatic animals are not so numerous in their species as the land animals; but they surpass them in size and longevity. The elephant and ostrich yield in bulk to the whale, the largest fish of the ocean, its length being often from sixty to seventy feet; it lives as long as the oak, and no land animal can vie with it in length of life. If we may rely upon certain accounts, there are creatures in the ocean far exceeding the size of the whale; as the animal called kraken, said to exist in the northern seas, and whose circumference is half a German league. Who can number the different species of animals which people the seas? Or who can determine their form, structure, size, and properties? How infinitely great is that God who has created the sea will be the conclusion of all who investigate the subject!

It is not without the wisest reasons that the Creator has made the ocean and the seas to occupy two-thirds of the whole globe. The seas were not only to form great reservoirs of water, but by means of their evapoporation, to be the sources of rain, snow, and various meteors. What wisdom is displayed in the connection which the seas have with each other, and in their continual motion! And it is not less wonderful that the bottom of the ocean is nearly of the same nature as the surface of the earth. There are found in the sea, rocks, caverns, plains, springs, plants, and animals; and the islands are only the summits of a long chain of mountains. When we consider that the seas form a part of the globe the least investigated, we are disposed to believe that they contain many more wonders, which neither the senses nor the understanding of man have yet been able to penetrate, but which all testify the adorable wisdom and power of the Most High. To him then who has established the monuments of his grandeur and the sceptre of his glory in the ocean as upon the earth, be ascribed all admiration and praise!

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* See reflection of Feb. 7, vol. I.

JULY XXIII.

Different Shades observable in Flowers.

With a heart beating with joyful emotions I look round and see all the beauties of the creation. How lovely are the tints! How pleasing their combination! How admirable the diversity of shades! Here the colours are exquisitely touched with the lightest pencil; there they arrest the eye by their brilliancy and deeper glow. The ground-colour is always such as to show the picture stretched upon it to the most advantage; whilst the green surrounding the flower, or the shade of the leaves, gives life to the whole.

In thus distributing and diversifying the colours, nature has procured us the most agreeably sensations. How great and numberless are the works of God! how wisely arranged! We cannot sufficiently admire the grandeur of his designs, the magnitude of his views, nor the wisdom he employs in their execution. It is only with labour and incessant toil that men can accomplish any single work: and after many fruitless efforts, at length sometimes succeed so as to imitate some one of nature's works But the Supreme Power, the immortal God, in a single moment has given life to millions of beings, and has created them in perfection according to their different states and degrees. The more we examine the works of art, the more will their imperfections appear, while for nearly six thousand years the works of nature, formed by the infinite hand of God, have been contemplated with increasing delight, without a single error being discovered in the plan, or any thing suggested that could render the execution more perfect. The more we investigate the works of God, the more their beauty delights, and their perfection pleases; whilst our love and veneration for their Divine Author increases.

Flowers are particularly pleasing by their simplicity. Our single element, under the forming hand of nature, assumes all this beautiful variety. The moisture of the earth and air insinuates itself into the vessels of plants, and filters through a series of transparent tubes, and this is the cause of all the beauties which we observe in the vegetable kingdom. If each colour had its particular cause, the surprise of the beholder might not be so great: but we contemplate with delight, and are never weary of admiring as the effect of supernal wisdom, a work, which, so diversified in its parts, is nevertheless perfectly simple as to its cause; by which we see a number of effects depending upon a single spring, always acting in the same manner.

Whilst viewing with rapture the beautiful variety of colouring displayed in flowers, we must necessarily feel the value of that reason which we enjoy as beings endowed with immortality, without which in vain would the charms of nature unfold to our senses. With the light of reason we are able to know and distinguish the numberless beauties of flowers, to appreciate the infinitely-varied blending of their tints, and all the delightful scenery of the meadows, valleys, forests, and mountains; making them contribute to our pleasures, and finding in each evident traces of an Almighty God. Father of light and mercy! Parent of good! What can we render unto thee, or how can we sufficiently thank thee, for that choice and pure gift of reason which elevates our souls from earth to heaven, and raises us from the nature of brutes unto the dignity of angels?

JULY XXIV.

Summer Heat.

At this season of the year we generally experience the greatest degree of heat; though the sun, having now entered into the sign Leo, daily removes farther from us. When we were nearer to him, the heat was temperate; and now that we are farther off, it is at its greatest degree of fervency. The reason of this is from the peculiar arrangement of our globe. The sun was lately nearer to us; but as his rays had not sufficient force to penetrate deep into the earth, we only felt a temperate degree of heat: but in the space of some weeks, the earth, and the bodies which cover it, are so much heated, that even the least influence of the sun produces more effect than at the beginning of summer when it acted upon cold bodies.

Some people murmur at this arrangement of nature, and complain of the intenseness of the heat, which renders them incapable of bearing much fatigue; but to repine at an arrangement founded upon the immutable laws of nature, and consequently an inevitable effect of certain causes, is failing in gratitude to our Heavenly Father, by censuring his government, which never fails in the end to promote the general welfare of the world. And to repine because one day is hot and

and another dry, bespeaks a weak head and a bad heart. If these heats were not sometimes to occur, how could the fruits which are to nourish men during the winter arrive at maturity? Thus all our murmurings at the decrees of Providence, who always out of evil worketh good, are the offspring of folly and of ingratitude. Though the inhabitants of the western part of Africa, and particularly of Cape Verd and the island of Goree, are exposed during the whole year to the most intense heat, their bodies are so organised that they can endure it without suffering in their health; and the winds continually blowing over the country, temper and cool the air.

And has the Creator been less bountiful to us? Is it not from his tender cares that the summer nights cool the air, and produce a delightful freshness? A single night revives the languishing plants, gives new vigour to the enfeebled animals, and enables us to sustain the fatigues of the day with alacrity. Even the storms which cause so much fear, are in the hands of God the means of purifying the air, and refreshing the creation. And we have a variety of deliciously cooling fruits, that tend to preserve our health at this season. Let us then no longer complain of the sun's heat, nor of the sufferings that we endure; but consider them as a part of the divine plan, and as being alleviated by a thousand means that ought to excite our gratitude and adoration.

JULY XXV.

Of some remarkable Properties in Animals.

Of all parts of nature the animal kingdom presents us with the most curious subjects of investigation; and to the lover of natural history the different instincts with which animals are endowed form a highly interesting study. To a reflecting mind it is not merely a pleasing amusement; the properties of animals cause us to look up to a wisdom which we cannot penetrate, and which surpasses all human conception. And this effect I wish to produce in my readers, by pointing out to them the singularities observable in certain animals.

The manner in which birds and insects lay their eggs is worthy of admiration. The grasshopper, the lizard, the tortoise, and the crocodile, neither trouble themselves about their eggs, nor about their young when hatched. They deposit their eggs in the ground, and leave them to be hatched by the heat of the sun's rays. Other species of animals, by a natural instinct, lay their eggs in places where their young can find a sufficiency of food as soon as they are hatched. This instinct never deceives them. The butterfly of the herbivorous caterpillar will never lay her eggs upon meat, neither will the flesh-fly lay her eggs upon vegetables. Some species of animals have so much sollicitude for their eggs that they carry them with them wherever they go. The spider called the wanderer carries her eggs in a little silken bag. When they are hatched, they range themselves in order upon their mother's back, who travels about with her load, and continues for some time to take care of them. Certain species of flies deposit their eggs in the bodies of living insects, or in their nests; and we know that there is not a single plant that does not serve to lodge and feed many insects. A fly pierces the leaf of an oak, and deposits its eggs in the hole it has made; the wound soon closes up, the part swells, and excrescence or tuberosity appears, called the gall; the eggs that have been enclosed within it, grow in size, and the insect which they produce finds in its resting place suitable aliment.

The care which animals take of their young is almost incredible; and their love for them is often greater than for their own lives. How assiduously some quadrupeds nourish their young! When wounded, they cure them by licking them with their tongue; they carry them from one place to another; when dangers threaten, they keep near, to defend and guide them. If they are carnivorous, how careful their dam procure them flesh, teaches them to pursue their prey, to play with it when in their power, and then to tear it to pieces! We cannot read without emotions of grief, and feeling sentiments of horror and detestation rise in our bosoms, the account of a bitch, which, whilst they were dissecting alive, continually licked her young ones, as if to solace her affection, and mitigate her torture by this maternal gratification; and when this last consolation was denied by taking away her young, she uttered a piercing and most lamentable cry.

Some sea-animals during a storm shelter their young under their belly. Each species of animals has its peculiar wants and desires, for both of which the Creator has abundantly provided. Let us take for example those creatures which seek their nourishment in the water; and amongst these the water-fowl. Nature has furnished their feathers with an oily matter, through which water cannot penetrate; by this means they do not become wet in diving, which would impede their flying. The proportions of their bodies also differ from those of other birds. Their legs are placed more behind, to enable them to stand up in the water, and more readily to expand their wings. That they may swim with ease, their feet are provided with webs: to facilitate their diving, their body is peculiarly formed; and to enable them to seize their prey, they have a long neck and a large bill: in short, nature has completely formed them for their particular mode of living.

The nautilus is a shell-fish something resembling the snail species; when they wish to ascend, they place themselves in front of their shell, and to render it more light, empty out the water through an opening. When they wish to descend, they retire to the bottom of their little house, which filling with water, becomes heavy, and sinks. If they wish to sail, they skilfully turn their shell, which becomes a little gondola, and they stretch out a thin light membrane, which swells before the wind, serving as a sail; and perhaps it might be this little nautilus that first taught men the art of sailing.

It is the same with the actions of animals as with their structure. The same wisdom which has formed their body has constructed their limbs, and appointed them their use; has also regulated the different actions that they perform, and directs them towards the end proposed in their creation. The brute is guided by the invisible hand of the Creator, and produces works which excite our admiration, and seems to be actuated by reason. It ceases to work when necessary, regulates its labour according to circumstances, and yet only follows certain secret springs that make it move. It acts as a machine which cannot judge of the work which it executes: and is directed by the adorable wisdom of the Creator, who has placed each insect, as he has each planet, in a sphere from which it cannot deviate. When I observe then the different instincts and industry of animals, my soul is filled with veneration, and I seem to see the immediate operation of a Divine Power, which is only visible by its wonderful effects; and whoever attentively considers the different works of nature, must every-where discover the evidence of a God, and abundant cause to love and admire his sempiternal wisdom and goodness.

JULY XXVI.

The Human Countenance.

The external appearance of the human body at once declares the superiority of man over all living creatures. His face, directed towards the heavens, prepares us to expect the dignified expression which is so legibly inscribed upon his features; and from the countenance of man we may judge of his important destination and high prerogatives.

While the soul enjoys undisturbed tranquillity, the features of the face are calm and composed: but when agitated by emotions, and tossed by contending passions, the countenance becomes a living picture, in which every sensation is depicted with equal force and delicacy. Each affection of the mind has its particular impression, and every change of countenance denotes some secret emotion of the heart The eye may in particular be regarded as the immediate organ of the soul; as a mirror, in which the most tumultuous passions and the gentlest affections are reflected without disguise. Hence it may be called with propriety the true interpreter of the soul, and organ of the understanding. The colour and motions of the eye contribute much to mark the character of the countenance. The human eyes are in proportion nearer to one another than those of any other living creature; the space between the eyes of most of these being so great as to prevent their seeing an object with both their eyes at the same time, unless it is placed at a great distance.

Next to the eyes, the eye-brows tend to fix the character of the countenance. Their colour renders them particularly striking; they form the shade of the picture, which thus acquires greater force of colouring. The eye-lashes, when long and thick, give beauty and additional charms to the eye. No animals, but men and monkeys, have both eye-lids ornamented with eye lashes; other creatures having them only on the lower eye-lid. The eye-brows are elevated, depressed, and contracted, by means of the muscles upon the forehead. The lids are of use to defend the eye, and prevent the cornea from becoming dry.

The forehead forms a very considerable part of the face, and when well formed adds much to its beauty; it should neither project much, nor be quite flat; neither be very large, nor yet small; fine hair adds much to its beauty.

The nose is the most prominent and least moveable part of the face; hence it adds more to the beauty than the expression of the countenance. The mouth and lips are on the contrary extremely susceptible of changes; and if the eyes express the passions of the soul, the mouth seems more peculiarly to correspond with the emotions of the heart. The rosy bloom of the lips, and the ivory white of the teeth, complete the charms of the human face.

Without considering the several uses of these parts, we have ample testimony of their divine origin; and, in contemplating the beauty of the human countenance, our admiration increases in thinking of that Being by whose wisdom and goodness we are so exquisitely formed. Whilst we examine each feature, let us meditate upon those high prerogatives which we enjoy over the animal world, and upon the noble purposes for which we are created. Our eye commands the face of nature, and glances from earth to heaven; our lips dance to the music of hymns in praise of our God; and every feature of the mind illumined face displays that goodness of heart, and purity and intelligence of soul, which amiable modesty, retiring from the gaze of men, in vain attempts to conceal.

JULY XXVII.

Gravity of Bodies.

ALL bodies possess a *force* which acts at all times, in all places, and in all directions. If a body attempts to move more *forcibly* towards one point than to another, it is said to gravitate towards that point. Experience teaches us, that bodies have a tendency to descend; or that if they are far from the surface of the earth without being supported, they fall down perpendicularly. It is not in the body itself that we must seek the cause of its gravity; for a body which falls remains in the state in which it was first placed, till some external cause changes its direction. It is equally impossible that the air should be the cause of this gravity; for, possessing weight itself, it would rather retard the velocity of falling bodies. We must therefore look for the cause elsewhere. Perhaps the opinion approaching nearest to truth, is that which supposes the earth has the property of attracting bodies placed at a certain distance. Or perhaps we may impute the cause of gravity to some foreign matter distributed through all bodies.

But though we cannot exactly ascertain its cause, nothing is more clear than the advantages which result from it. Without the power of gravity we should not be able to move as we do. Our centre of gravity is about the middle of our bodies; when we raise the right foot, we must bear this centre upon our left. If we bend our body forward, we are in danger of falling; but, by extending our right leg, we prevent our fall and make a step. Thus our walking is in some measure a continual series of interrupted falls. Hence, when we ascend a hill, we bend our body forward; and backward when we descend. In carrying a burthen on our shoulders we incline forwards; and lean back when we carry it in our arms. All this proceeds from the laws of gravity, which regulate the motions of animals when they walk, swim, or fly.

The same laws are also extended to the heavenly bodies. The sun attracts the planets, and each planet attracts its satellites; or, what is the same thing, the planets gravitate towards the sun, and the satellites towards the planet; for a body made to revolve in a circle would always fly off from the centre in a right line, if it met with no obstruction. The planets revolve in *their* orbits with the greatest velocity. It seems as if a motion as rapid as that of the moon should whirl her from us to an immense distance in the immeasureable space, if there was not a force which continually impelled her towards our globe, and which was strong enough to counteract the force tending to propel her from the earth. And this force is the gravitation of the moon towards the earth. If our earth was either lighter or heavier than it is, it would approach too near to, or fly off too far from, the sun: in the one case, nobody could support the heat; in the other, cold would be equally unbearable: either every thing upon the globe would be consumed by heat, or frozen by excess of cold.

Here again we have fresh cause to admire and adore that Wisdom, which, by means apparently so simple, regulates the motions of animals, and wields the vast globes that roll in the firmament. By the laws of gravity alone the smallest particles of dust are prevented from being lost, either from our earth, or from any of the globes which continually revolve round us. We here see the greatness of that power and wisdom which produce the most astonishing effects by means which appear to us the most insignificant.

JULY XXVIII.

Many Effects in Nature proceed from the same Cause.

UNIVERSAL nature is an endless chain of causes and effects; and as all parts of the universe bear a relation to each other, every motion and every event depends upon a preceding cause, and itself becomes the cause of effects which follow its action. The whole constitution of the world is well calculated to convince us that it is not chance, but a Divine Wisdom surpassing all conception, which first erected this wonderful edifice; impressed motion upon its different parts, and determined the great chain of events to depend upon and succeed each other with order and regularity. It is not difficult to acquire this degree of knowledge; for though our acquaintance with nature is very limited, we yet are able to perceive that many important effects depend upon causes evident to human intelligence. As a proof of this we may instance many natural phenomena.

What a variety of effects are produced by the heat of the sun! It not only contributes to the life of an innumerable multitude of animals, but also to the vegetation of plants; to the ripening of seeds and fruits; the fluidity of water; the elevation of vapours; and to the formation of clouds, without which we should have neither rain nor dew.

The air also is so constituted as to answer various ends. By means of this element animals are preserved alive, and all the vital functions performed with vigour. It is by means of the air that the fire burns, and combustion is supported; that sound is conveyed in undulations to the ear; that winged creatures fly from place to place; and that man traverses the vast extent of the ocean. It is the air which supports the clouds, till, becoming too heavy, they fall in rain; it is that which prolongs our day by means of the twilight; and without air the gifts of speech and of hearing would be useless. All these, and many other advantages, depend upon the air in which we live and breathe. Is not then this wonderful element, which surrounds our globe, and is too subtle for our eyes to behold, and yet so strong that nothing can resist its force, a most evident proof of the wisdom of God?

The power of gravitation existing in all bodies preserves the mountains in their places: restrains the ocean within his depths, and keeps the earth within her prescribed orbit; supports every created being in its proper place in nature; and prescribes to the stars of heaven the course they are to observe.

Who can enumerate the various uses of water? It serves to dilute, to soften, to dissolve, and mix many substances which we could not otherwise use. It constitutes a most wholesome beverage, is the chief nourisher of plants, sets in motion mills and other machines, is the habitation of fish, and bears upon its surface treasures from the four quarters of the globe.

How varied and numerous are the effects of fire! And it is not only in the natural world that we see many diversified effects proceed from the same cause; in the moral world we also often see a single disposition of the mind produce effects not less various. Let us take for example the natural inclination which prompts us to love our fellow creatures. From this are derived the solicitude of parents for their children; social union; the bonds of amity; patriotism; goodness in those who govern, and fidelity in those who obey. Thus a single propensity keeps each individual in the circle prescribed for him; becomes the bond of civil society, and is the principle of virtuous actions, laudable enterprises, and innocent recreations. All this furnishes the most evident proof that the world is not made by accident, nor the materials which compose it put together by chance, without relation or connection between each other; but, on the contrary, that it forms a regular whole, which the Divine Power has ordered with infinite wisdom; and in every phenomenon of the visible world some rays of this ineffable wisdom blaze forth, and declare the unutterable goodness of God.

JULY XXIX.

Of some Diseases in Plants.

VEGETABLES are subject to many diseases. Sometimes they are covered with a white matter which sticks to them like dust, and is called mildew. This does not happen from insects, as is commonly believed; but from a stagnation in the juices, and a beginning of corruption, which attracts insects, and invites them to deposit their eggs. The stagnation of the juices is the first stage of corruption; and it is supposed that that alone is sufficient to attract insects, because they are seen to swarm by millions as soon as, from whatever cause, natural or artificial, the circulation of juices in a tree is stopped. Hence the feeblest trees, and those exposed in unfavourable situations, are the most subject to this malady. If insects were really the cause of it, it could not be produced by art; whereas if a tree is purposely wounded, or deprived of the care it requires, it will become subject to the mildew. And upon this tree so weakened immediately are seen thousands of insects, whilst the neighbouring trees are free from them. Hence this corruption is no more owing to insects, than is the decay of animal substances; we must look for the cause of it in the obstruction of the juices, which may be occasioned by many circumstances.

A matter resembling dew, but which is glutinous, sweet, and acrid, frequently destroys plants. It has been thought that insects conveyed this glutinous juice into vegetables, or that bees had deposited honey upon them. But frequent observations have demonstrated that this matter falls from the air in form of dew. In certain countries it is deposited in small drops upon a great variety of different vegetables; and in the space of a single night it will cover almost all the leaves of a long row of trees, upon which it had not been before preecived. Perhaps this dew may be formed from the exhalations which rise from flowers and blossoming trees, out of which the bees extract their honey; and if more is deposited in one place than in another, it is owing to the direction of the wind. Perhaps also it may be the effect of some disease in the plants, from their juices being vitiated; for it is the branches, leaves, bushes, and weakest trees, that are most subject to this disease. It is also remarked, that the leaves upon which this species of dew falls, become spotted and black, and soon spoil; most probably this substance is the cause of it.

Here we find evident traces of Divine Wisdom; for since insects require nourishment, it is advantageous to us that they are directed to obtain it from those vegetables which, being already spoiled, are become useless, if not prejudical, to us. And this is a new proof of the particular provision which God made for man when he established the world. It is owing to this arrangement that these insects take nothing that is necessary for our support; but on the contrary attach themselves to that which would be destructive to us. In the wise œconomy of Nature, each plant, tree, and animal, serves for the support of different creatures.

JULY XXX.

Means of Subsistence which Nature provides for Animals.

It is a great proof of the goodness and supreme power of the Almighty, that there is every-where provided a sufficiency of aliment for all the living creatures with which the world is filled. It is not indeed wonderful that the countries which lie within the temperate zones should supply their inhabitants with a sufficiency of nourishment; but that this should be the case in all places, even where we had least reason to expect it, and that the necessary provisions never fail to so many species of animals, can only be attributed to the cares of a beneficent and all-wise Providence. He has proportioned the supply of provisions to the number and wants of the animals which are to consume them. In most places there is a superabundance; but this profusion is not so great as to cause the alimentary matter to spoil or decay, for that would be prejudical to the world.

Amongst the many articles of nourishment, those which are most useful and necessary are generally found in the greatest abundance, and multiply the most readily. As there are a great number of animals which only live upon herbs, the meadows abound with them and the most wholesome plants, that grow spontaneously without the least culture, and easily resist the inclemency of the air. It is also highly worthy of attention, that corn, which is such a great source of food for man, can be cultivated with so little trouble, and increase so astonishingly.

It is also a wise regulation, of the Creator, that the taste of animals is so varied, that some love to feed upon herbs and corn, some upon flesh, others upon insects, &c.; some are content with a little, others are very rapacious. If all species of animals had an inclination for the same kind of food, the earth would soon become incapable of satisfying their wants, and would presently be converted into a vast desart. The diversity of taste then that we find amongst animals is a certain proof that it is not by accident that they prefer any particular kind of food, but from a particular instinct implanted by nature, which leads them to those aliments best adapted to them. By this means all the productions of the earth and of the sea are properly distributed; not only every thing which breathes is amply provided for, but those substances which becoming putrid might be prejudicial, have their particular uses. For the wholesome plants would perish; the carcases of birds, fish, and animals, would exhale the most poisonous effluvia; but that it has pleased the all-wise Creator to implant in animals an inclination for these different substances which furnish them with an agreeable aliment.

Nutritious matters offer themselves spontaneously to the greater part of animals; they must therefore possess great skill in discerning them, and must employ great precaution in their choice. They are so constituted, that what is highly nourishing to one species, is injurious and sometimes poisonous to another. From the experiments and observations of botanists, it appears that oxen eat of two hundred and seventy-six species of grass, and reject two hundred and eighteen; that goats eat of four hundred and forty-nine, and leave untouched one hundred and twenty-six; that sheep feed upon three hundred and eighty-seven, and there are one hundred and forty-one which they will not feed upon; that the horse eats of two hundred and sixty-two, and refuses two hundred and twelve. Some animals are obliged to go to a great distance in search of nourishment, and obtain it with much labour, by digging for it in the earth, or collecting it from various parts where it is thinly scattered. Some choose the dead of night to satisfy their hunger in safety; others obtain their food by separating the grain from its husks, bruising them if hard; and swallow small stones to assist them in digesting. Many would perish if they did not carry provisions into their nests against a future time of need. Others take their prey by having recourse to wiles and cunning, by laying snares, and by digging holes in the ground; and some pursue their prey in the air, in water, and upon land.

The more diversified is the food of animals, and their manner of procuring it, the more admirable is the wisdom and goodness of God displayed in their preservation. Let us then reflect upon the glorious perfections of our Heavenly Father; for the occasions which we find to magnify his name are more frequent than the day.

JULY XXXI.

Meditation upon the Works of Nature.

O FATHER, Creator of the universe, and Preserver of every living creature, how great is thy majesty! How many are the wonders which thou unfoldest to the eyes of man! Thy hand has extended the heavens, and planted them with stars. To-day I see the sun animate nature, and blaze above the horizon in meridian splendour; but perhaps, ere to-morrow's dawn, to me no more will the groves, the meadows, and the valleys, repeat the melody of the birds. I feel that I am mortal; my strength fades like the grass of the field, and withers like the falling autumnal leaf; the strongest amongst us knows not how soon the awful summons shall be heard, Man, return to dust!

When laid low in the grave, where darkness and mournful silence reign, when the worms are gnawing our once fair bodies, what will remain to us of our earthly possessions? Will not they be all lost to us, though our utmost desires had been gratified, and our cup of happiness during life had been full?

How foolish it is to be attached to the perishing things of this world! to aspire after great riches; to be ambitious of honours, vain and transitory? and, suffering ourselves to be dazzled and misled by the false lustre of their meretricious charms, exchange our innocence and peace of mind, for envy, pride, and deceit.

If, too greedy in our desires, we have pursued the phantom of wealth beyond the just limits of moderation, let us humble ourselves before our God, and receive that chastisement his wisdom shall direct.

Man, blinded by his pride and his presumption, would wish to prescribe laws to his Creator, and dares to blame the decrees of Eternal Wisdom. But the all-powerful and benevolent Father and Friend of man loves him better than he does himself, by refusing to grant his foolish desires.

When the morning opens to our rejoiced sight, the green fields and budding flowers glistening with dew, and the wings of the night have cooled the burning summer heat, wisdom cries out to us, Why will you cherish in your bosom gloomy thoughts of futurity, and give yourselves up to doubts and heart-consuming care? Is not God our Father, and are we not his children? Will not He who has made us, also provide for us? Our existence is not confined to this earth; it extends to heaven. Our present life is but for a moment, and the greatest earthly happiness is no more than a dream; we are designed for another state, that of immortal beings.

The contemplation of immortality elevates our souls above the earth and all present things, beyond the universe and all the heavenly spheres, unto the everlasting Fountain of glory and light.

When seduced by false pleasures from the path of virtue, may sentiments like these awaken our hearts to a sense of our duty, and a conviction that true pleasure only can arise from the consciousness that we are employing our time and our talents in the promotion of truth and of all good! The ill-acquired honours of the wicked soon perish; and the bitterness of anguish succeeds their short-lived glory, and false, fleeting, mistaken pleasures.

We are but as pilgrims journeying through a country, at the utmost boundary of which we see the rays of glory emanating; and nothing short of this should possess our hearts: unallured by the pleasures, and undazzled by the splendour, the riches, and the honours, that would seduce us from the true and only road to immortal felicity, we should steadily hold on our course, in the confidence of integrity, of virtue, and of ability; praying to the Almighty God, who with pleasure and parental love watches over us, that in the infinity of his goodness he will be pleased to soften our hearts, that they may not become hardened by the scenes we are obliged to pass through in our mortal career, and that all our thoughts may be purified by charity and religion; that we may not covet outward grandeur, but be content with our condition and allotment, faithful in the discharge of every duty, and worthy the name of Christians.

AUGUST 1.

Varieties of Stature in Men.

The height of the human body varies considerably; the ordinary measure of stature is from five to six feet. Some inhabitants of the northern countries and the borders of the Icy Sea are not five feet high. The shortest men yet known inhabit the mountains in the

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may they experience all the sentiments of love and admiration
which thy goodness ought naturally to excite. Augt. 11

interior of the island of Madagascar, being scarcely four feet high. Many of these diminutive people came originally from countries, whose inhabitants are of the ordinary size; and the cause of their degeneracy must be attributed to the [illegible] of the climate which they now inhabit. The excessive [illegible] that prevails during the greatest part of the year causes the vegetables and animals there to be [illegible] in other climates; and why may not man be affected by the same circumstances?

On the other hand, there are countries whose inhabitants are of the most gigantic size. The most celebrated of these are the Patagonians, who dwell near the straights of Magellan. They are said to be from eight to ten feet high. And it certainly seems by no means impossible that there should exist men greater in stature than Europeans; besides the traces we meet of them in the histories and monuments of antiquity, we have sometimes seen in our climate men above six feet and a half in height, perfectly well formed, healthy, and capable of every exertion and labour which demands force and agility. Adorable Creator! thy wisdom is also evident in the varieties of the human form. All that thou hast created, whether in the animal, vegetable, or mineral kingdom, has been formed by certain rules and organised by certain laws; whilst every thing bears thy image, and is strongly impressed with thy power.

AUGUST 11.

Vegetation of the Stalk of Wheat.

The wheat-plant is composed of the principal stem, of the stalks growing from its sides, and of the branches which proceed from these. The stalk begins to form as soon as four green leaves appear. If the little plant is then taken, and the lower leaf carefully separated, a small white point may be seen, which in time becomes a stalk, and the root appears under the first leaf. The white point springs from a knot, opens out into green leaves, and pushes from the sides a new point. However, these different points, and the stalks which grow from them, are not all designed to bear fruit; many of them decay and perish. When the principal stem has acquired some growth, a considerable revolution takes place in the plant, and all the sap is then employed in the formation of flowers and fruit.

But before that, and when the plant begins to vegetate, four or six leaves are seen to form and spring from as many knots. These prepare the nutritive juice for the ear, which is seen very diminutive in spring upon opening the stalk through the middle. When the plant begins to bud, the two upper leaves of the stalk join together, embrace the ear of corn, and protect it till it has acquired some degree of consistence. Before that, all the knots, particularly the two last, though soft, are closely connected, leaving very little space between them. But as soon as the ear has pieced its coverings, these parts lengthen, and the leaves give them all the juices they contain. The knots gradually become harder, and the lower leaves dry up; the juices which nourished them are then only employed in supporting the stem.

After all these preparations, the blossom appears. It is a little white tube, very delicate. and grows from the seed-leaf. Several more small stalks surround this bag. They are at first yellowish, then brown, and just before they fade and fall off become black. The principal use of these stalks is to nourish a little cluster in the bag of grains. When the corn has ceased to blossom, we see grains which contain the germ, and which arrive at perfection long before the farinaceous matter appears. This matter gradually increases, whilst the sap collects round an extremely fine and delicate part, resembling down. This substance, which exists after the blossoms, serves to support the opening of the great tube passing through the corn. The fruit begins to ripen as soon as it has attained its full size; at that time the stalk and the ear become white: and the green colour of the grain changes into yellow or light brown. The grains however are still very soft, and their *farina* contains much moisture; but when the corn has arrived at maturity, they become hard and dry.

We cannot sufficiently admire the wisdom manifested in the structure and vegetation of corn: those who are accustomed to reflect will discover it in the least stalk. Even the leaves which surround it before it has attained its full growth, have their use; and they seem to be placed round the stalk for the same reason that an architect raises a scaffolding round a building he is about to construct, and when it is finished removes the scaffolding. For when the corn has acquired its full size and strength, the leaves which defended it become dry and perish. It is some months before the ear ventures to appear and expose itself to the inclemency of the weather; but as soon as all the preparations for the flowers and fruit are ready, it appears in a few days. The stalk and the ears of corn are both constructed with equal intelligence. Merciful and beneficent Father! may all those who now walk through the fields of wheat, and joyfully behold the waving corn, experience all the sentiments of love and gratitude which thy liberal bounty ought to excite in their hearts; and may they unceasingly endeavour to imitate, and by their actions deserve, such goodness!

AUGUST XII,

Dog-days.

THE sun has not only a diurnal motion, which carries him from east to west, and which occasions the revolution of day and night; he seems also to have another sensible motion from the west to the east; in consequence of which, at the expiration of three hundred and sixty-five days, he is near the same stars from which he was separated for six months and again approached during the other six months of the year.

Hence ancient astronomers have divided the seasons by the stars which the sun meets in his annual course. This course they divided into twelve constellations; these are the twelve signs of the zodiac, which they called the twelve houses of the sun, because he appears to remain a month in each of them.

The summer season begins when the sun enters the sign Cancer, which happens on the twenty-first or twenty-second of June. It is then that he attains his highest degree of elevation above the horizon, and that his rays fall most directly upon us; and at this juncture the summer heat begins, which becomes more intense in the ensuing month, as our earth becomes more heated by the burning rays of the sun. Hence it appears, that the month of July and a part of August are generally the hottest portion of the year; and experience has proved, that it is from the twentieth of July to the twentieth of August that the greatest degree of heat prevails. Of all the stars with which the sun comes in conjunction, the dog-star is the most brilliant. Lost in the sun's rays, it disappears from us for a month (as is the case with all the stars that the sun meets in his course), and the month in which it is not seen is the time called the dog-days.

These observations would be of little importance, if they did not tend to combat a prejudice deeply rooted in the minds of many people. An ancient tradition attributes the heat experienced at this time to the influence of the dog-star upon the earth. But this opinion is absurd; because the occultation of the dog-star in the sun's rays does not always take place at the time we call the dog-days. These days, properly speaking, do not begin till the end of August, and terminate about the twentieth of September. And as the dog-star, or Sirius, always advances farther, in time it will reach the months of October and November, and at last to January; so that the most intense cold of the year will prevail in the dog-days.

When we consider this, we shall perceive that it is impossible that this star can occasion the great heats which we experience. When therefore in the supposed dog-days every thing is languishing or consumed, the waters dried up and the springs fail, matters subject to fermentation become sour, animals are attacked with madness, and men with various maladies; it is not because a star is concealed behind the sun, but from the excessive heat of the weather occasioned by another cause.

It is time then to renounce a prejudice so childish and absurd. To believe that certain figures, which the imagination forms in the sky, can have any influence upon our earth, or upon the health or the reason of man, bespeaks a great want of judgment. It is not the stars, but ourselves, that we ought to accuse of all the evils which we suffer. Can we believe that an all-pure and good Being who governs the universe, has created any thing in the heavens or in the earth for the torment and misery of his creatures? This would be believing in an inevitable fatality; which we cannot admit of if we acknowledge a Creator whose essence is wisdom and goodness. Let us then, instead of being guilty of this error, glorify our God, and assure to ourselves tranquillity and peace of mind, in the belief that we are under the peculiar care of a superintending Providence, without whose permission not even a hair of our heads can perish.

AUGUST IV.

Sleep.

PEOPLE fall asleep with more or less rapidity, according to their natural constitution and present state of health. But whether sleep arrives soon or late, it always comes in the same manner; and the preceding circumstances are the same in all men.

The first thing that happens when we begin to sleep, is the stupor of our senses; which, no longer receiving external impressions, fall into a state of inactivity. Hence it follows that the attention diminishes, and at length ceases; the memory becomes confused; the passions are calmed; and the connection between our thoughts and reasoning faculty is interrupted. As long as we feel the influence of sleep, it is only the first degree of it; we may be then said to be in a dozing state. When we are really asleep, we have no longer that consciousness and reflection which depends upon the exercise of memory; our eye-lids wink, open, and shut, of themselves; the head reclines in an easy position; and when our sleep is quite profound, all voluntary functions are suspended; but the vital functions, and all those which do not depend upon the will, are still performed with vigour. A sweet sleep refreshes and repairs our exhausted nature; and we rise from our slumbers with increased energy, capable of again renewing the fatigues of the day.

All these circumstances are well calculated to make us acknowledge the goodness of God, so mercifully extended to us in his tender care to procure us the blessing of sleep. We ought to be still more thankful, when we consider the effects of sleep being ushered in by a complete suspension of activity in the senses; and that it steals upon us unawares, and in a way not to be resisted. The first of these circumstances renders it more sound and refreshing; the other makes it an unavoidable necessity. And how wisely is it ordered, that by the spontaneous closing of the eye-lid the eye is defended when we are not able to preserve it from the dangers to which it would have been subjected!

Let therefore the hour in which we dispose ourselves to enjoy the sweet influence of sleep, be always preceded by thanksgivings to our Heavenly Father! Let us not only bless him because the days happily succeed each other, but also because he has so constituted us, that a state in which for a space we repose from the cares, the troubles, and the vexations of the world, is to us a state of refreshment, in which we acquire new force and gain accumulated vigour. Let reflections like these be the last which take place before sleep surprises and locks up our soul in silken fetters; and when morning dissolves the charm, let love and gratitude to our God be the first emotion of our heart.

AUGUST V.

Divisibility of Matter.

To be convinced of the infinite divisibility of bodies, we have only to walk into a garden, and inhale the sweet incense that rises from a thousand flowers. How inconceivably small must be the odoriferous particles of a carnation, which diffuse themselves through a whole garden, and every-where meet our sense of smell! If this is not sufficient, let us consider some other objects of nature; as, for instance, one of those silk threads the work of a poor worm. Suppose this thread is three hundred and sixty feet long, it weighs but a single grain. Again, consider into how many perceptible parts a length of three hundred and sixty feet can be divided. A single inch may be divided into six hundred parts, each as thick as a hair, and consequently perfectly visible. Hence a single grain of silk can be divided into at least two millions five hundred and ninety-two thousand parts, each of which may be seen without the help of a microscope. And as every one of these parts may be again divided into several more millions of parts till the division is carried beyond the reach of thought, it is evident that this progression may be infinite. The last particles which are no longer divisible by human industry, must still have extension, and be consequently susceptible of division, though we are no longer able to effect it.

Again, if we examine the animal kingdom, we shall discover still further proofs of the infinite divisibility of matter. Pepper has been put into a glass of water, and on looking through a microscope, a multitude of animalcules were seen in the water, a thousand million times less than a grain of sand. How inconceivably minute then must be the feet, muscles, vessels, nerves, and organs of sense, in these animals! And how small their eggs and their young ones, and the fluids which circulate in them! Here the imagination loses itself, our ideas become confused, and we are incapable of giving form to such very small particles.

What still more claims our attention is, that the more we magnify by means of glasses the productions of nature, the more perfect and beautiful do they appear; whilst with works of art it is generally quite the contrary; for, when these are seen through a microscope, we find them rough, coarse, and imperfect, though executed by the most able artists, and with the utmost care.

Thus the Almighty has impressed even upon the smallest atom the stamp of its infinity. The most subtile body is as a world, in which millions of parts unite and are arranged in the most perfect order. What astonishing wisdom is that which operates with as much order and perfection in the minutest as in the largest works! How infinite that power which has brought out of nothing such a multitude of different bodies! And how gracious is that goodness which so richly displays itself in the most minute productions, seeing that each of them has its perfection and use!

Considerations like these tend to make us feel the limits of our capacity; the smallest insect, the least grain of dust, may convince us that there are thousands of things of which we are ignorant, and cannot explain. Let him who boasts of his talents attempt to enumerate the parts of which the body of an animal, a million of times less than a grain of sand, is composed. Let him try to determine how minute one of those rays of light must be, when several millions of them can pass through an opening not larger than the eye of a needle. His ideas will soon be confused; and he will be obliged to acknowledge his ignorance, and confess the narrow limits of his capacity. How then can we be proud of our knowledge, and have the presumption to blame the decrees of Providence, or dispute the arrangements he has made in nature? It is our duty, and even our glory, to acknowledge our ignorance, and in all humility bow before the infinite God.

AUGUST VI.

External Structure of Insects.

Men in general are too apt to judge those animals only worth their attention which are most remarkable for their bulk. The horse, the bull, the elephant, and other large animals, seem to attract our attention, whilst we scarcely condescend to regard those innumerable multitudes of small insects which fill the air, the vegetables, and the dust. How many insects do we trample upon! How many caterpillars do we destroy! And how many flies buzz around us without exciting our curiosity, or any other thought than how to deprive them of life! But let us never forget, that the same wisdom and power is manifested in the structure of the meanest worm, as in that of the lion or elephant.

The bodies of the greater part of insects are composed of several rings, which close on each other, and have a share in all the motions of the animal. The essential characteristic which distinguishes insects from other animals is, that they have no solid bones, And much wisdom is manifested in this part of their formation; the motions which are common to all insects, the manner in which they are obliged to seek their nourishment, and the changes to which they are subjected, could not be so easily performed, if, instead of those flexible rings, which separate from and approach nearer one another as the animal wills, their bodies had been connected and strengthened by bones.

It is observable in several insects that they have the power of contracting or enlarging their heads at pleasure; that they can elongate or shorten them, conceal or make them appear, as their inclination or necessity urges. There are others, whose heads always preserve the same form. The mouth of insects is generally provided with a sort of teeth, or with a trunk. This disposition of the head is necessary, both on account of the aliments which the insects feed upon, and because of the dangers to which they are exposed.

Many insects have not the faculty of vision; but this is compensated by their more exquisite feeling, or some other sense. They have two kinds of eyes: those which are bright and smooth are usually very few in number; but those eyes which resemble net-work or shagreen, and of which the cornea is cut in angles, are extremely numerous; there are sometimes thousands of them, and as they are not moveable, this defect is supplied by their number and position. The antennæ, or horns, with which most insects are provided, are of particular use to them; they are extended before the body when it moves, and feeling out the way, not only inform the creature of the dangers which threaten it, but also enable it to discover the aliments best suited to its nature.

The legs of insects are either scaly or membranous: the former move by means of several joints; and the others, which are softer, move in all directions. Sometimes both these species of legs are found in the same insect. Some insects have several hundred feet; but their motion is not accelerated by them.

The variety observable in the form and constitution of the limbs of insects is almost infinite; and the lives of many men would scarcely suffice to describe the different figures of this minute part of the creation. How curiously must the legs of those insects be constructed which fasten on smooth and polished surfaces! How elastic the legs of those which leap! and how strong must those be which dig in the ground! Two or four wings are placed in the middle of the body. Some of them are as transparent as fine gauze, others are scaly and mealy; some are without any covering, others are concealed in cases or sheaths. At the sides, or at the extremity, of the body, there are orifices something like the pupil of the eye; they are called stigmata, and are the organs of respiration. How various are the forms of the insects which walk, fly, leap, and crawl! and yet in all the most perfect harmony and proportion of form is observable. And not to acknowledge in all this the infinite wisdom of the

Creator, is the height of folly and absurdity; we are only virtuous and rational in as much as we confess an Almighty and Supreme Power, and bless and adore him in all the works of the creation.

AUGUST VII.

Comparison between the Senses of Men and those of Animals.

Are any animals endowed with more perfect senses than man? In certain particular instances some of them undoubtedly are; but in general man is more highly favoured in this respect than all other animals. It is indeed asserted that the spider has a finer feeling; and the vulture, the bee, and the dog, a keener smell. We know that by means of this sense the hound pursues his game; and other dogs discover things beneath the ground. The hog also, guided by his smell, digs in the earth for food. Stags are supposed to have the sense of hearing so acute, that they can hear the sound of bells at several miles distance; and the mole hears better below the earth than man who dwells upon the earth.

With regard to sight, the eagle amongst birds, and the lynx amongst quadrupeds, are said to be much more perfect than man. Though these observations are true, yet if we consider animals in general, and compare them with man, we must immediately be struck with his great pre-eminence in the creation. He is by nature endowed with five senses; and this advantage is not enjoyed by one half of animals. The zoophites, which form the connecting link between the animal and vegetable kingdoms, have only the sense of feeling. Many animals have only two senses, others three, and those which have five are considered as the most perfect class. But these have very seldom all their senses more perfect than men, some of whom enjoy them in a very exquisite state. Some Indians can judge by their smell what quantity of alloy is mixed with the precious metals, as well as we can by the touch-stone. Others will discover at a very great distance the retreat of a wild beast. The inhabitants of the Antilles will distinguish by their smell whether a Frenchman or a negro has last passed along the road.

The acuteness of his senses in some degree compensates the wild Indian for his want of education. Many people, by exercise and great attention, have improved certain senses to a wonderful degree of perfection; and if man, like other animals, was destitute of the reasoning faculty, and had no means of procuring food, or preserving himself from danger, but his organs of sensation; these by continual exercise would doubtless have acquired the highest degree of refinement and acuteness. But constituted as he is, man has no occasion for more acute senses than those he already possesses. The gift of reason abundantly compensates him for the advantages that some animals have over him; and we may even assert with confidence, that if our senses were more refined, we should experience great inconvenience from them. Let us take for example the sense of hearing: if we had this sense so acute as the safety of some animals requires it to be in them, the most distant noise, and the confused clashing of a vast number of sounds, would continually interrupt our meditations and repose, and prevent our most noble and useful occupations.

Let us then be thankful that the infinite wisdom of God has so well arranged the degree of our sensations, that they enable us fully to enjoy the blessings of nature, without interrupting the workings of the soul. The limited degree of our senses is then rather to be considered as a gain than a loss: as a perfection, rather than an imperfection: and happy is the man who suffers his reason to controul and restrain his senses when they impel them to deviate into folly, to plunge into the mad vortex of fashion.

AUGUST VIII.

Thunder.

THE thunder rolls! Consider, O man, who it is that causes this dreadful roar! Who is it that darts the lightning from the clouds! It is the Lord of the universe; the arm of the mighty God hurls the thunder-bolt.

Nature reposes in his hand; he preserves and blesses her, but his voice will be heard, and at the sound thereof the heavens shall be consumed, the earth devoured by the flames, and they shall be no more.

The thunder peals! Dreadful is the sky involved in storms! The lightning flashes, and the thunder-bolt is shot! Great is our God, and omnipotent his power! The Lord looks down from his throne, and by the lightning's gleam we see the grave open under our feet.

When the God of heaven rides upon the whirlwind, men tremble and are afraid; when he unveils his face, the universe turns pale, and none can behold the glory of his countenance.

The sinner hears his voice, and his soul sinks appalled: he dare not look upon him whose counsels he has neglected. The good man contemplates the majesty of God without fear; and his soul is untroubled amid the tempest's howl and the storm's fierce rage. The Lord shields him from the thunder-bolt, which strikes terror into the heart of the wicked.

And though it is the will of his Heavenly Father that the righteous man should die, he cheerfully resigns his soul into the hands of his Maker; and his last words proclaim his inward peace, and that whether he lives or dies, his only hope is in his Saviour and his God.

He who directs the thunder is the friend and all-consoling hope of the Christian. What though he should take me away suddenly from amongst the living It is that I may dwell in the regions of light and glory, and ever drink of the pure fountain of bliss.

He who, when the sky is serene, and every wind is hushed, glorifies his Creator with joy and thanksgiving, is still calm and undaunted when the sinner is hiding himself from the threatening storm.

But whither will he fly? Can he escape the eye of an all-penetrating God? In vain does he attempt to hide himself; the lightning pursues and smites him in his dark retreat.

Think not of escaping then, O ye wicked, nor trust that flight will save you; renounce your errors, and give up your delusive dreams; ye cannot conceal yourselves from your God, who is every-where present. Whilst the thunder roars, you tremble and are troubled; but the tempest ceases, nature breathes, and you return to the deceitful pleasures that have bewildered your reason.

But if you would obtain pleasures that never fail, prostrate yourselves before the throne of God; implore that mercy, which is never refused to the penitent; and forget not the promises that you made, the vows which you uttered in the hour of your distress, and in the moment of your tribulation; remembering that God has declared he is a God of justice, and will not be mocked.

He is merciful and long-suffering; he spares the rebellious, but he will not spare for ever. He is just and before his holy tribunal we must all appear. What is the thunder that roars over our heads in comparison of that awful day, when we shall hear the sound of the tempest; when the elements themselves shall be dissolved by fire; and the earth and all that it contains be consumed with ardent heat?

AUGUST IX.

Contemplation upon a Meadow.

Ye gloomy and majestic woods, where the fir-tree rears its stately head, where the tufted oaks spread their thickening foliage: and ye rivers, whose clear silver streams roll among the blue mountains, or gently glide through the vales below; with you I love to roam, and mark the landscape lessening on my sight till all is wrapped in shade!

But now other beauties invite me forth; the verdant mead, all gay with flowers, attracts me. Vegetables of a thousand kinds refresh the air; millions of insects, their painted wings glittering in the sun, are flying from flower to flower in sportive mood; whilst others are winding through the dark labyrinths of the tufted grass; all varying in beauty, and each seeking for food and pleasure

How soothing is the murmur of yon limpid stream, as its waters gently wash the flowers that, bending over the grassy bank, oft kiss the dimpling wave, or dance reflected on its surface!

See those waving plants! what a mild lustre the sun beams on the different shades of green! Some delicately entwine with the grass, and mingle with it their beautiful foliage; others proudly rear their heads above the rest, and display flowers without perfume; whilst the lovely violet, in lowly modesty drest, dwells beneath the bank, and scents the air with fragrant odours. Thus we often see the man of worth and integrity, obscured by poverty, unnoticed, and unregarded, diffuse blessings round his humble sphere; whilst the slave of ignorance and villainy, shrouded in the all-protecting garb of riches, consumes in idleness the fruits of the earth, and receives the applause of millions.

How beautiful is nature! The grass and flowers grow luxuriantly; the trees are covered with leaves; the soft zephyr refreshes us; the flocks wanton in the pastures; the little lambs declare their joy by a thousand sportive skips, and frisk lightly over the mead. The green grass, tipped with sweet dew, adorns the field; the leaves tremble in the breeze, and the melody of the nightingale rises from yonder bush. Every thing is joy, every thing inspires love; it reigns on the hills and in the valleys, on the trees and in the groves.

Nature is beautiful even in her least productions. The sporting insects pursue each other in the grass; sometimes lost in the verdure, then rising and displaying their gilded wings, dancing in the sun-beam. The butterfly hovers over the clover, flutters its wings, and seems proud of its charms. The buzzing of a swarm of young bees now meets my ear. See the flowers bending under them! They have gaily flown from their distant home, and dispersed themselves over the fields and gardens, where they collect their honeyed nectar of the flowers, and riot in luxurious sweets and ever-varying charms.

Happy is the man whose life of innocence smoothly flows embosomed in nature's sweetest treasures. The creation smiles to him, and joy gilds his glad moments; whether reclining in the evening shade, or brushing with hasty steps the morning-dew. Pleasure springs for him from every fountain; every flower yields its charms, and every grove welcomes him to its hallowed shade. For him wild concerts warble in the air; and his mind, serene as a summer's day, knows no corroding, heart-consuming care: his affections are pure as the untainted breath of morn, sweet as the dew-washed flowers: in the beauties of nature he sees his God, and to him devotes his willing soul.

AUGUST X.

Mischief caused by Animals.

It is distressing to see some of the finest productions of nature exposed to the ravages of animals. Every summer we observe the mischievous effects of the rapacity of birds and insects in the vegetable kingdom! How many trees are destroyed, and fruits consumed, by worms and caterpillars! And how much necessary sustenance we are deprived of by the insatiable sparrow and greedy raven! These and similar complaints are often uttered by men who seem to imagine that certain animals only exist to torment mankind. It is true, there is some foundation for such complaints; and it must be granted that some creatures do occasion much mischief. It is more easy to exterminate wolves, lions, and other wild beasts, than to extirpate insects, whose numerous swarms cover a whole country. In Peru, a species of ant called chako is a terrible scourge to the inhabitants; and their lives would be endangered if they did not use precautions to get rid of these formidable insects. The devastation made by caterpillars on our fruit-trees, and by mice in our fields, is well known.

But however great these inconveniences may be, they do not authorise such bitter complaints as some people make. We are pleased to see the animals which are mischievous to us destroy one another; we think we may without injustice deprive animals of life, either for our food or any other purpose; but we cannot bear they should take any thing from us. But have we more right to take away the life of a gnat, than it has to take a drop of our blood? Besides, in complaining of the voracity of animals, we do not consider that this arrangement of nature is not so disadvantageous as it may at first sight appear. To be convinced of this, we have only to consider the animal kingdom in an enlarged point of view. We shall then find, that many species of animals, birds, or insects, apparently hurtful, are on the contrary of great utility. Several years ago, the inhabitants of the then English colonies of America endeavoured to extirpate the tribe of jays, because they imagined that these birds did great injury to the corn. But the number of jays was scarcely diminished, when immense numbers of worms, caterpillars, &c. ravaged their corn-fields. They immediately stopped the persecution of the jays; whose numbers again increasing soon put an end to the plague, the consequence of their destruction.

Some time ago, a project was formed in Sweden to destroy all the crows; but it was observed, that these birds were not only fond of seeds and plants, but they devoured a great number of worms and caterpillars, which live upon the leaves and roots of vegetables.

In North America great exertions were used to drive away the sparrow tribe; and in consequence of their success, the flies and gnats multiplied to such a degree in the marshy countries, that large tracts of land were left uncultivated.

Pheasant-hunting is so considerable in the island of Procita, that the king of Naples prohibited the use of cats to the inhabitants. In a few years the rats and mice becoming extremely numerous, caused so much mischief, that his Neapolitan majesty was obliged to revoke his decree for the annihilation of cats.

Why should we be so selfish as to wish to deprive animals of the provisions necessary for their subsistace? Are we able ourselves to consume all the fruits of the earth? And do we find any deficiency in our sustenance or our pleasures, because birds, insects, and a few animals, partake with us of the blessings which God has so bountifully bestowed, and of which a part must spoil if these creatures did not make use of it? Instead then of indulging in unjust complaints, let us rather acknowledge the wisdom of our Creator. Every thing is connected in the vast kingdom of nature; no creature is useless, or placed there without an end, though we are ignorant of the destination of many animals. It is sufficient that they exist, for us to suppose that they are created for the wisest purposes.

Thus, the consideration of the apparent disorders and imperfections of nature leads us to God, who has created nothing in vain, who preserves nothing without reason, and who, when he permits any thing to be destroyed, does not do it without some useful design. If we were sufficiently convinced of these truths, all the works of God would excite us to glorify and to bless his Divine power and goodness.

AUGUST XI.

Variety of Colours.

WHEN we consider how dull and gloomy our fields and gardens would be, and how indistinct every object would appear, were there only one colour, we must acknowledge the wise goodness of God, who by causing such a diversity of hues, has increased and varied our pleasures. Objects which are designed to be seen at a distance are painted in glowing colours, and are striking by their grandeur; such are the heavens: whilst those objects which we can contemplate nearer, as birds, flowers, &c. have a peculiar lightness, fineness, delicacy, and elegance.

But whence proceeds the difference of colours? Each ray of light appears to be simple, but by refraction it is divided into several, and hence arises the diversity of colours. A glass filled with water and exposed to the sun, reflects certain colours upon white paper; and angular glasses, or prisms, reflect still more vivid colours. By holding a prism towards the sun, we may see the colours of the most beautiful rainbow; or it may be done by receiving a ray of light on the prism, through a small hole in the window-shutter of a room closely shut. As the refraction of the rays is more or less strong, the colours will be more or less vivid. The most refrangible ray is the violet, and consequently it is the weakest. Next to it is the indigo; then the blue, next the green, then the yellow, next orange; and lastly the red, which is the least refrangible of all.

The nature of coloured bodies contributes much to the diversity of their colours. The smallest particles of most bodies are transparent; hence they break, absorb, or reflect, the rays of light, sometimes one way and sometimes another, like prisms. And what completely proves that colours are not inherent in bodies is, that the neck and plumage of a pigeon or peacock; and stuffs, such as taffetas and other silk stuffs, &c.; change colour according to the position in which they are placed. This may enable us to understand whence the variety of colours proceeds; which is nothing more than that the surface of bodies is composed of extremely thin laminæ; which, according to their thickness, reflect certain coloured rays, whilst they admit or absorb others in their pores. Thus, when a body whose surface is smooth reflects and throws back almost all the rays of light, it appears white; but when it absorbs them all, it is black.

Let us here admire the goodness and wisdom of God; for, if the rays were not divisible and differently coloured, all would be uniform, and we could only distinguish objects by reasoning, and by the circumstances of time and place. We should be reduced to the most awkward perplexity and uncertainty; our eyes would be fatigued with constantly seeing one colour, and we should be weary of the continued uniformity. But the diversity of colours existing in nature diffuses beauty over the earth, and procures new and repeated variety of pleasure. In this we have abundant proof of the provident cares of God; who has provided for our pleasures as well as our necessities, and in creating the world has regarded the beauty as much as the perfection and utility of his works. Far as the eye can reach, we discover new and varied beauties in the plains, in the valleys, and the mountains: every thing conduces to our pleasure, and calls forth our gratitude.

AUGUST XII.

Habitations of the Beavers.

If a man who had never heard of the industry of beavers, and their manner of building their dwellings, were shown the edifices which they construct, he would suppose them to be the work of some most skilful architects. Every thing is wonderful in the labours of these amphibious animals, the regular plan, the size, the solidity, and the admirable art, of their buildings, must fill every attentive observer with astonishment. The beavers choose their place of abode where there is a plentiful supply of provisions, and a river in which they may form a lake to bathe in. They begin by constructing a dyke or bank, which keeps the water level with the first floor of their building: this bank is sometimes a prodigious work, from ten to twelve feet thick at the foundation; it is made sloping, and gradually diminishes in thickness, till, towards the top, it is not more than two feet broad. The materials of which it is composed are wood and clay. The beavers cut pieces of wood as thick as a man's arm with great facility. They fix these in the earth by one of their extremities, very near to each other, and entwine round them other pieces that are smaller and more flexible. But as the water may still pass through, and leave their watering-place dry, they make use of clay to fill up all the interstices both within and without, so well that the water cannot possibly flow through; and in proportion as the water rises, they raise their bank.

Having finished their dyke, they begin to work at their houses; which are round or oval buildings divided into three stories, raised one above the other, one of which is below the dyke and generally filled with water, the other two are above. They fix these buildings very firmly upon the brink of their lake, and always with stories, that if the water should rise, they may still be able to lodge above it. If they find a little island near their watering-place, they build their house upon it, as being more firm; and they are also less incommoded by the water, in which they cannot remain long at a time. If this convenience is not to be obtained, with the assistance of their teeth they force stakes into the earth to support their building against the force of wind and water. They make two openings at the bottom to go out into the water; one leads to the place where they bathe, the other to the place where they deposit whatever might dirty their upper apartments. They have a third door, placed higher up, for fear of being taken when the ice closes up the lower doors. Sometimes they build their houses entirely upon dry ground, and dig ditches from five to six feet deep, down to the water. They use the same materials and the same industry for their buildings as for their banks. The walls are perpendicular, and about two feet thick. With their teeth they cut off the ends of the wood and sticks that project from the wall; and then mixing clay with dry grass, they make a composition, with which they plaster, by means of their tail, the inside and the outside of their building. The inside of their house is arched, and its size is proportioned to the number of inhabitants. A space twelve feet long by eight or ten broad is sufficient for eight or ten beavers. If the number is greater, they enlarge their building in proportion.

The instruments which the beavers use are four strong and sharp teeth; the two fore feet, of which the toes are separated; the two hind feet, which are furnished with membranes; and their tail, which is covered with scales, and is like an oblong trowel. With only these simple tools, they excel our masons and carpenters with all their apparatus of trowels, squares, axes, saws, &c. With their teeth they cut the wood which they use in their buildings; their fore feet serve them to dig the ground and to prepare the clay. They use their tail both to carry the mortar or clay and to plaster their houses.

The works of beavers then have the greatest resemblance to those of men; and upon their first appearance we may imagine them to be produced by rational and thinking beings. But when we examine them nearer, we shall find that in all their proceedings these animals do not act upon the principles of reason, but by an instinct which is implanted in them by nature. If reason directed their labours, we should naturally conclude that the buildings which they now construct would be very different from those they formerly made, and that they would gradually advance towards perfection. But we find that they never vary in the least from the rules of their forefathers, never deviate from the circle prescribed to them by nature; and the beavers of the present time build exactly after the same plan as those which lived before the deluge. But they are not the less worthy of our admiration. In these sagacious creatures we have an example of the great diversity there is in the instinct of animals. How superior is the instinct of the beaver to that of the sheep! May we profit by our discoveries of the different faculties of animals so as more and more to advance in perfection, and increase our knowledge of the love and infinite power of God!

AUGUST XIII.

Manner in which the Nutrition of the Human Body is effected.

Alimentary matter, when taken into the stomach, is separated into two parts: the one nutritious, which remains in the body; the other not nutritive, is expelled from it. It is first requisite that the food should be broken, and its parts decomposed. This is begun in the mouth by the process of mastication. The fore teeth, or incisors, cut and divide the pieces; the canine, or side teeth, tear them; and the double teeth grind them small. The tongue and lips also contribute to this, by keeping the food under the teeth as long as is necessary. Certain glands, pressed upon during the process of mastication, pour out saliva to moisten the food, and render it more easily divisible, as well as facilitate its digestion. Hence the great advantage of well chewing the food before it is swallowed.

The aliments thus comminuted, moistened, and mixed, are received into the pharynx or beginning of the throat; in which canal there are glands that continually secrete a fluid that lubricates the throat, and renders the passage of the food more easy. When this is too dry, the sensation of thirst excites us to drink. The food follows the course of the throat till it is received into the stomach; a membranous bag, in which is secreted a fluid called the gastric juice, by the action of which upon the food digestion is performed. When we have too long abstained from eating, the gastric juice, stimulating the nervous coat of the stomach, occasions the sensation of hunger. The stomach is continually in motion by the contraction of its fibres from above downwards, so that its cavity is straightened; the lower-termination rises towards the middle, and the whole is equally contracted. The aliment, prevented from returning into the throat by means of a valve covering the upper orifice of the stomach, readily passes through the inferior opening or pylorus into the intestinal canal, which is properly a continuation of the stomach. This canal is subject to a constant motion, called the peristaltic motion, by means of which the whole alimentary mass is completely agitated.

By the preceding operations, the aliment is reduced to a pulpy mass, which passes slowly through the intestines by means of their vermicular motion; and is there mixed with the bile, which is secreted by the liver, and stimulates the intestines to act. In each intestine are discovered the orifices of very fine vessels, called lacteals. The whitest and purest part of the alimentary mass passes through these, and is conveyed by them into a larger vessel, which passes from the abdomen through the chest, and terminates in the veins. The white colour of the chyle is then lost among the blood, and it is no longer distinguished from that fluid: and thus prepared and perfected, it is conveyed by numerous canals to every part of the body, to which it imparts life and nourishment. The gross and innutritious part which remains in the larger intestines, passes from the colon into the rectum, whence in due time it is expelled from the body.

From this short account we learn what a variety of operations are requisite to accomplish one of the daily necessities of our body. How many parts and organs concur in providing for the growth and nourishment of the whole! And what is most admirable is, that all the parts of our bodies, which are thus exercised for its nutrition, serve also for other purposes. The tongue for instance, which contributes so materially to mastication, is also the organ of speech and of taste. In fact, there is not one member of our bodies which has only one office. Let us reflect upon these peculiar mercies of God; and whether we eat or drink, or whatsoever we do, let it be to his glory.

AUGUST XIV.

Nature considered in different Points of View.

THE works of nature, ever superior to those of art, are particularly so from their admirable variety, which always affords new subjects of wonder and pleasure. We look at a work of art till we become weary with seeing it, or regard it with indifference. But the mind is never fatigued with contemplating and reflecting upon the works of nature, which continually present new charms to the delighted imagination.

When we consider nature in her most sublime and majestic point of view, how astonished we are at the immensity of the heavens, the innumerable multitude of the stars, and the vast extent of the ocean! Compared with these, all the works of art, however great and excellent, are insignificant and contemptible. Every thing that God has created is stamped with a grandeur far surpassing our conception. To give us an idea of his infinity, he had only to form the sky, which displays more magnificence and grandeur than all that the earth contains. Is any thing more likely to inspire us with a profound veneration for God, than to contemplate him in his works? If we are rightly concerned, what a religious awe fills our minds when we behold those grand phenomena of nature which no man can produce; such as earthquakes, volcanoes, storms, tempests, and floods; all of which forcibly impress the mind with the majesty of the Creator of the heavens and the earth!

Nature also is presented under a more pleasing aspect; we see valleys adorned with verdure and flowers, fields which promise abundant crops, and mountains green with trees and beautiful plants. In all these lovely scenes the God of nature shows himself the friend and benefactor of man; he extends his bountiful arm, and plentifully satisfies every living creature. And this present season, in which every thing combines to delight our senses and conduce to our nourishment, furnishes the strongest proofs of his goodness.

But the time approaches when nature will assume a more gloomy appearance; when she will lose her beauty and variety, and resemble a desert void of all pleasure and riches. Each day brings us nearer this mournful season; and the lengthening evenings begin to warn us of the change. Even then nature has still attractions, and winter concurs in the perfection of the creation.

Let us apply these reflections to our lives, which are equally liable to change and sudden variations. To the most happy and delightful scenes often succeed the most trying and unfortunate. Let us then in prosperity prepare for adversity, and in every situation of life glorify and bless the Father and Giver of all good.

AUGUST XV.

Damages which may be occasioned by Rain.

A MODERATE quantity of rain always contributes to the growth and fertility of plants, and consequently is of great benefit to the earth. But when it falls with two great vehemence, or continues too long, it becomes hurtful to vegetables. When too violent, it forces the delicate plants into the ground; and its too long continuance prevents their growth. A superabundant moisture deprives them of the necessary degree of heat; the circulation of the sap is interrupted; the secretions are imperfectly performed, and the plants droop and are in danger of perishing.

But this is not the only way in which rain is prejudicial. It sometimes causes great destruction. When several clouds, driven by fierce winds, meet in their course high towers, mountains, and other elevated places, they break, and suddenly pour down the water they contain in torrents. This often occasions much damage; for water not being compressible, when it is much pressed it suddenly precipitates itself from mountains and other high places. It is not surprising then that it carries *along with it* the heaviest stones, beats down trees, and *overthrows buildings.* Two causes concur in rendering these *effects* more violent: the great volume of water precipitated, and its rapidity, increased by the height from which it falls; the action of a moving body being in proportion to the mass of matter it contains, and the degree of velocity impressed upon it.

Water-spouts are still more formidable. In figure they resemble an inverted cone, whose base terminates in some cloud, whilst the point is directed towards the earth. These water-spouts attract and draw up every thing in their way, and afterwards dash them down in the torrent. If the point of this conical stream strikes the sea, the water boils, foams, and rises into the air with a terrible noise; and if it falls upon vessels or buildings, it shatters and throws down the one, and so violently shakes the other that they often founder. According to all appearances, this meteor is produced by the action of winds blowing in contrary directions, and which in their passage meeting with clouds, drive them with violence against each other. When these opposite winds strike a cloud on one side, they give them a circular motion, and make them whirl round with considerable velocity. They then take the form of a whirlwind and their weight being suddenly increased by the force of pressure, they rush down with impetuosity, and in their fall assume the figure of a column, at one time conical, at another cylindrical, which turns round its centre with great velocity: and their violence is in proportion to the quantity of water, and to the rapidity of the descent.

Cataracts and water-spouts are always dangerous. Fortunately the latter very seldom occur on land, though they are frequent at sea. Mountainous countries are more exposed to cataracts than are those situations which are more flat and level; and they so rarely happen, that many years often pass before even a few acres of ground are destroyed by them. Such are some of the disastrous effects produced by these phenomena: but the good man, far from murmuring and complaining when he hears the storm howling around him, or witnesses the dreadful devastation of the cataract, bows his head in humility, and acknowledges with grateful reverence the blessings he is daily permitted to enjoy; whilst these interruptions of the general harmony of nature are only partial evils, and very seldom happen. Let us then consider the works of God with humility and adoration, and endeavour to form just ideas of their magnitude and excellence.

For, doubtless, infinite order, goodness, and wisdom always prevail, even where the limited faculties of man can discover no traces of their presence.

AUGUST XVI.

Cares of Animals for their Young.

THAT instinct which leads brutes to preserve their young is one of the most remarkable faculties with which nature has endued animals. We find scarcely any creature which abandons its eggs or its young to blind chance. Their love extends to their posterity in a very great degree, and operates in that way which is best adapted to their nature and different modes of living. Some of these little creatures, which are hatched from the eggs of fish and insects, have no need of being covered by their parent, because the heat of summer is sufficient to vivify and strengthen them; and from the first moment of their birth, they are able to assist themselves, provided they are in a suitable place, and have provisions within their reach. The greater part of insects do not live long enough to see their young. Fish and amphibious animals cannot distinguish their young ones from those of the same species; and yet nature teaches them the best means of providing for the principal wants of new generations. Fish swim in shoals, and deposit their spawn near the coasts, where the water being shallow is more easily warmed by the heat of the sun, and where in consequence the young fry are more easily hatched, and obtain the requisite food.

Amphibious animals quit the water and deposit their eggs in the sand, that they may be hatched by the sun's rays; as if they were aware that their young would readily find their true element, and the place in which they were destined to live and seek their food. Gnats, and other insects, which come to life in water, but which afterwards live in the open air or upon the earth, always lay their eggs where the life of their young is to begin. Insects which fly above the surface of the earth, and which generally require no food for themselves, are however careful to deposit their eggs upon plants, fruits, flesh, and other substances which will serve as nourishment for their young. Some of them pursue animals, and insinuate their eggs in their skin, hair, mouth, and entrails. Some animals deposit their eggs in nests and cells which they have prepared and stored with provision proper for their young. Other animals, which at the time of birth cannot help themselves, are taken care of by their parents.

How great is the solicitude of birds, even before they lay their eggs! Each species has its peculiar mode of constructing its nest. How assiduously and patiently they sit upon their eggs for some weeks, scarcely allowing themselves time to eat their food! With what care they keep their young warm after they are hatched, and supply them with the necessary food! What courage they display in defending them from harm, often exposing themselves to danger whilst protecting their helpless little ones! Is it not also a very remarkable instinct in animals that induces them to cut the umbilical cord of their young with their teeth, and with such precaution as to prevent any loss of blood? How tenderly do they suckle them, and how carefully do they guard them from danger!

In general the instinct of all animals for the preservation of their young is stronger than the desire of satisfying their own wants. They suffer hunger and thirst, refuse sleep and all indulgence, and even expose their own lives, rather than neglect their offspring. In this instinct which nature has given to animals we may observe most admirable wisdom; for the preservation of every species depends upon the cares of the parents. That viviparous animals should have so much tenderness for their young is not so very remarkable, because they are their own flesh and blood: but that oviparous animals should have an equal solicitude for their eggs is truly wonderful.

Adorable Father of nature! Who does not here perceive and admire thy wisdom? Who does not acknowledge thy goodness in watching over the preservation of the animal world; making it subservient to our wants and to our pleasures? May the eyes of all be opened, so as they may behold more clearly the wisdom which shines so beautifully in all the works of the creation!

AUGUST XVII.

Sensibility of Plants.

CERTAIN motions may be observed in plants, which makes it probable that they are possessed of sensibility. Some plants shrink and contract their leaves upon being touched; others open and shut their flowers at certain fixed hours, so regularly as to denote with precision the time of day; some assume a peculiar form during the night, folding up their leaves; and these different changes take place whether they are in the open air or shut up in close apartments. Those which live under water during the time of fecundation raise their flowers above the surface. The motions of a marshy plant discovered some time since in the province of Carolina are still more singular. Its round leaves are furnished above and on the sides with a multitude of notches that are extremely irritable. When an insect happens to creep upon the superior surface of the leaves, they fold up and inclose the insect till it dies; the leaves then open of themselves. We may daily observe regular motions in some plants in our gardens. Tulips expand their petals when the weather is fine, and close them again at sun-set, or during rain. Vegetables with pods, such as peas and beans, open their shells when dry, and curl themselves up like shavings of wood. Wild-oats, when placed upon a table, will move spontaneously, more especially if warmed in the hand. And the heliotrope, or sun-flower, with various other plants, always turns towards the sun.

These are incontestable facts, of the certainty of which every person may be readily satisfied. From them, some have concluded that we ought not to deny sensibility to be an attribute of plants; and certainly the facts which are alleged in favour of such an opinion give it great appearance of probability. But, on the other hand, plants have no other sign of sensibility; and all that they have is entirely mechanical.

We plant a shrub, and destroy it, without finding any analogy between it and an animal. We see a plant, bud, blossom and bear seed, insensibly, as the hand of a watch runs round the points of the dial. The most exact anatomy of a plant does not unfold to us any organ which has the least relation to those of animal sensibility. When we oppose these observations to those from which we might infer the sensibility of plants, we remain in uncertainty, and cannot explain the phenomena related above. Our knowledge upon this subject is very imperfect, and is confined to simple conjecture. We can neither attribute sensibility to plants, nor deny it to them, with certainty.

Let us then rest satisfied with ascribing unto our Creator the glory that is his due; and be convinced, that whether plants have sensibility or not, whatever be the principal of the phenomena of which we have been treating, the arrangements of nature with respect to these and all other things are dictated by wisdom and infinite goodness. We have great cause to be content with the little we have yet discovered in the vegetable kingdom, though we are to learn no more; and though the particular point in question still remains obscure and doubtful, what we already know is sufficient to gratify our curiosity and inspire us with the love of God. Let us only endeavour with earnestness to apply the knowledge we already possess to useful purposes, without perplexing and entangling ourselves in the mazes of speculation, always more curious than beneficial; and without being anxious to obtain that information which our limited faculties do not permit us to acquire, and which it is perhaps reserved for future ages more enlightened to discover.

AUGUST XVIII.

Fear of Storms.

AT the season in which nature presents to our view the most delightful scenery, and every thing abroad conspires to procure us joy and felicity, there are some people who still murmur and complain. They say that summer would be very pleasant, if storms did not so often disturb the harmony of nature, and stifle every sentiment of joy in the heart. This fear of storms and thunder is principally founded upon the opinion that they are the effects of the wrath of Heaven, and the ministers of an offended God For if such people considered how much storms contribute to purify the air from various noxious exhalations, and that they increase the fertility of the earth; if they did but employ the necessary precautions to shelter themselves from the dreadful effects of thunder; storms would lose their terrors, and would be regarded as benefits, more calculated to inspire gratitude than terror.

It may however be objected, that thunder and lightning often occasion great devastation; that they have often struck men and animals, and destroyed towns and villages. To this we may reply, that in this, as in many other things, fear often increases the danger, and magnifies the evil. To be convinced how rarely it happens that people are killed by lightning, we have only to be informed that out of seven hundred and fifty thousand persons who died in London during the space of thirty years, only two were destroyed by lightning. We may also observe that during a thunder-storm the generality of people prolong their fears without any real necessity. He who has time to fear, and be alarmed at the effects of the lightning, is already out of danger: for as that is the only thing which can be fatal to us, the moment we have seen it, and remain unhurt, we are safe; as the roar of the thunder which soon follows, whether, rolling at a distance, the peals break upon our ear, or, bursting with a sound that seems to rend asunder the concave of heaven immediately above our heads, is harmless as the echo that dies on the breeze.

If by reflecting upon the cause of these phenomena our fear does not subside, the surest means of preserving our firmness and strength of mind is by endeavouring to acquire a good conscience. The soul that is just and pure firmly relies upon the merciful goodness of his God, and calmly reposes amid the convulsions of nature. "He hears, without dread, the thunder roll. His Creator, the God whom he loves and adores, directs it; and knows when to terrify and when to strike; with storms and tempests He sometimes visits the hardened soul of the impious wretch that dares to deny his power, and dishonour his attributes."

AUGUST XIX.

Summer presents us with Images of Death.

A FEW weeks ago, when we walked in our gardens, we were surrounded with the most beautiful and pleasing objects, and every thing raised emotions of joy in our hearts. But now, every day diminishes the number of pleasing objects, or renders their appearance more uniform. The greatest part of the flowers which then beautified our gardens have disappeared, and we begin to have only faint traces of the once charming scenes which so ravished our senses. These revolutions in nature may be very instructive to us. There is a period in our lives in which all the charms of spring make gay and happy our moments, that swiftly glide away, while we are beloved and caressed by parents, fondly solicitous for our welfare, and anxiously expecting from our future conduct the rich fruit of all their tender cares. But how often is this hope deceived! Many a sweet floweret falls before the blossoms expand. Sickness withers our charms, and nips our opening beauties; and an early death changes hope into the gloom of despondency.

We see spring flowers which bloom till summer, then perish in a few hours. A very striking emblem of death! And scarcely a day passes in which some human being is not unexpectedly and without warning met by the unsparing messenger The days of men are as the grass; he flourishes as a flower of the field: the wind bloweth upon him and he is gone, and the place that knew him knows him no more.

We are now in that season in which the fervent rays of the sun induce us to seek repose in the refreshing shade of the groves. These cool sequestered retreats are favourable for serious reflection; and our thoughts will there sometimes be directed to the awful solemnity of the grave, where the just will be received as into a safe harbour from the tossings and dangers of a life of care and trouble.

The reaper prepares to cut down his corn; the sickle levels the tall ears on the right and on the left, and leaves behind it the fields empty and deserted. This is a just emblem of life: all flesh is as grass, and all the glory, all the honours and duration of life, as the flowers of the field: like them man flourishes for a time; and when the Lord of the harvest ordereth, falls under the scythe.

Let us imitate the activity and industry of the bees; and as they are busied in collecting and preparing their honey from every flower that scents the air, may we also be ever diligent in amassing those treasures of wisdom and virtue, which will be our delight when age presses heavily upon us, and our great consolation in the final separation of the soul from the body!

The husbandmen will soon assemble to collect the fruits of the earth, and deposit them in their granaries. The days of harvest are the most important of any in the year; but how much more solemn and momentous will be that great day, when the Creator of the universe shall himself collect the harvest; when the graves shall open, and deliver up their dead; when the Supreme Judge of nations shall say unto his angels, "Gather the tares into bundles to be burnt, but gather the wheat into my garner!" Upon this day of awful solemnity the righteous may meditate with joy and reverence: here they labour and travail, and weeping sow their seed in the ground; but the joyful day will arrive, when they shall carry their abundant harvest to the altar of God with songs of joy and of gladness.

Meditation upon death is proper to make this happy season still more useful and beneficial. When we consider death in its true point of view, far from regarding it as the enemy of our pleasures, we shall acknowledge that its contemplation ennobles our ideas, and increases our real felicity. When the image of death is frequently present to our minds, can we deliver ourselves up to riot and excess? Should we make an improper use of the gifts which God grants us, if we continually remembered that the hour must come, when we are to give an account of our stewardship to him whom no one can deceive? Would the blessings of this life possess our affections, if we considered how soon every thing must perish? If we considered that the evening would arrive and bring us ease and repose, should we murmur and repine at the burthens we bear through the heat of the day, or the sufferings to which we are subjected? Or, if we frequently meditated upon that better world, and those purer and more exalted pleasures, in which the souls of the righteous shall find a sure resting-place; should we imagine that our chief happiness consisted in the enjoyment of this world, and the pleasures it can afford?

AUGUST XX.

Causes of the Heat of the Earth.

The sun, without doubt, is one of the principal causes of the heat of this globe; and the warmth of a particular place is owing to its relative position to the sun. When he is on the southern side of the earth, the inhabitants of the northern parts have not so much warmth as when he approaches the north pole. The same thing happens in the southern parts of the earth, when the sun is towards the north. In those climates where the sun is almost vertical, the cold is never so intense as to freeze the rivers and lakes; the heat being very considerable in those regions. It becomes also very fervent when the sun continues long above the horizon, and his rays fall for a length of time upon the same place. Hence it is that towards the poles, where the days are very long, the heat in certain countries is sometimes extremely intense. From all these circumstances it appears that the sun and his relative position to the earth is one of the chief causes of the heat in open air.

But this is not the only cause; for if this were the case, the heat of every summer should be equal, and the temperature of countries in the same climate should be always exactly the same. But neither of these is the case; for it is observed that upon the highest mountains, where even there are spacious plains, and upon these mountains other hills and more plains, it is much colder than in the lowlands and in the valleys. Even under the line, if we ascend from a plain where the heat is scarcely supportable up a mountain several hundred feet high, we shall experience the most intense cold, and enter the region of snow and ice. It has also been remarked in winter, when, during the day, the cold has been very severe, it sometimes sensibly diminishes towards midnight, and then becomes temperate, although the sun's rays do not impart warmth to the atmosphere. This will prove then that there may be warmth in the air that is not immediately produced by the sun.

There are substances which emit sparks and take fire by friction and percussion. The axle-trees of wheels not sufficiently greased will take fire when the carriages roll with great rapidity. Other substances will become warm and enkindle when mixed together. If a certain quantity of water be poured upon a truss of hay or straw, a degree of warmth will be produced. Bodies which undergo the process of putrefaction and of fermentation often acquire an increase of temperature. Even in the air the motion of certain matters may occasion mixtures, solutions, and combinations, which produce a great degree of heat. Thus we may conceive how heat may be produced in the open air. At first the sun is the principal cause of it: to the heat which proceeds from this body are joined that of several living creatures and combustible matters, that which comes out of the bowels of the earth, from the depths of the seas, and from warm mineral springs. This heat is often much increased by the fermentation that different bodies undergo, either upon the surface of the earth, or in the upper regions of the atmosphere, where they produce warm exhalations. When therefore the particles of bodies which float in the lower atmosphere, and which are capable of receiving and retaining heat, are warmed, and have not been cooled or dispersed by wind and rain, their heat gradually increases till it becomes intense; and diminishes when any of the above causes cease to act.

All these arrangements are worthy of the wisdom and goodness of God; they are beneficial to all the parts of the habitable world; and every climate enjoys all the happiness of which it is susceptible. But we who live in a temperate climate most sensibly experience the providential and guardian care of our Creator, who has distributed to us cold and heat, in the wisest proportion, with a mercy that claims our gratitude and love.

AUGUST XXI.

Diversity of Plants.

The vegetable kingdom is particularly deserving of attention on account of the great variety in plants, with respect to their parts, fructification, and properties.

The manner in which fructification is performed in several plants is very obscure. We know very little of its process in mosses, mushrooms, and ferns. Some plants exhibit singular monstrosities. We see flowers which have no tops; there are some out of the middle of which other flowers spring. Certain plants, called sleepy plants, take a different situation at the approach of night from that which they had during the day. Others turn towards the sun; and some shrink and contract upon being touched. Some flowers open and shut at regular hours, or during particular states of weather; and some bud, blossom, bear fruit, and lose their leaves, earlier than others. Plants also differ according to the particular place in which they grow. They were all originally wild, that is, they once grew spontaneously without culture.

The Creator has assigned to plants that climate which best suits their particular nature, and where they will soonest arrive at perfection. But those which are exotics may be naturalised amongst us, and succeed very well, provided they receive a proper degree of warmth.

One of the most pleasing characteristics of plants is their great diversity of form. If we compare the most perfect species with those which are least so, or if we only compare together the different species of the same class, we shall be struck with admiration at the astonishing variety which nature has produced in the vegetable kingdom. If we only consider the numerous tribe of mushrooms, or the different species of plants termed imperfect, we cannot but admire the great fecundity of nature in these vegetable productions, which differ so much from all others that they can scarcely be ranked among the number of plants.

If we rise some degrees higher in the scale of plants, we contemplate with pleasure those which have stalks; from the grass which grows amongst stones, to that inestimable plant which is the chief source of our nourishment. We next observe the great variety of creepers; from the tender bind-weed to the vine.

Another most admirable thing in the garden of nature is, that in all this variety the most perfect harmony obtains. All plants, from the hyssop which grows on the wall to the cedar of Lebanon, have the same essential parts. A little herb is as completely formed as the most beautiful rose; and the rose as the most lofty oak. In all are observed the same general laws of growth and increase, and yet each species is distinct. Out of so many thousand plants, there is not one which does not possess a distinct character, properties, mode of receiving nourishment, of growing, and propagating itself. What inexhaustible riches we discover in their forms, colours, and proportions! What pleasure we receive from observing their varieties, and beholding the beauties of the vegatable kingdom! Our soul, delighted with the prospect, raises itself towards God, the Father and Creator of nature, whose bounty is every-where manifest: whose power has produced all these plants, and whose wisdom has arranged them in order and beauty.

AUGUST XXII.

Reflections upon the Animal Kingdom.

The animal kingdom may be considered as a well-regulated state, in which is a suitable number of inhabitants, each having an allotted place; faculties necessary to perform their requisite duties, and rewards and punishments to excite them to action; with a sufficient protection against their different enemies. In this republic of animals, those which are the weakest, and they are by far the greatest number, are obliged to submit to the greatest; and all are under subjection to man, as the representative of the Deity. The inhabitants of the animal kingdom find in all parts of the earth a sufficiency of food and employment. They are dispersed in every direction, and their nature, constitution, and organs, are adapted to the different abodes assigned them.

Their employments are various and tend either to increase their species, to provide for their subsistence, or to defend themselves against their enemies. All the parts of their bodies are adapted to their peculiar nature and functions. They possess certain instincts which compensate for their deprivation of reason; instincts which are diversified in various ways, according to their necessities; instincts for motion; instincts to enable them clearly to discern their food, to seize, and to prepare it; instincts to construct nests and suitable habitations; to propagate their species, to defend themselves and to secure shelter from danger, &c.

In each class of animals there are some that live upon prey, seizing the individuals that superabound in other classes. Each species has its peculiar enemies; hence none of them increase too much, and a proper proportion is maintained. Animals that are weak, or have some defect, are commonly the first which fall a prey to others, decayed fruits and carcasses are devoured, by which means the earth is not troubled with them; the air is not infected; and the purity and freshness of nature are preserved untainted.

Beasts of prey have a structure adapted to their mode of life; they have great strength, agility, industry, and cunning. But that they may not destroy the whole tribe of animals, they are restricted within certain limits. They do not multiply so fast as other animals; and they often destroy one another, or their young ones become the victims of savage rapacity.

Some animals sleep during the winter, and live upon the fruits of the earth. Weak animals are provided with the means of defence proportionate to their place of abode, and the dangers to which they are exposed;

their natural weapons, their agility, their hiding-places, and their cunning, preserve them from destruction; and thus the proper balance is maintained between every species of the brute-creation.

Animals are in some measure obliged to perform the functions assigned them; because upon this their comfort depends. They find their advantage in following the laws which nature has prescribed for them; and cannot transgress them without subjecting themselves to various evils. The class of mammalia are the largest in size as well as fewest in number, and they fulfil very important functions. Birds perform various offices; they eat superfluous grains, devour dead carcasses, and diminish the number of insects. The greater part of amphibious animals live upon prey. The least animals are the most numerous, and very voracious.

All that we see so admirable in the animal kingdom demonstrates the existence of a superior Being who is all-powerful, and infinitely wise. For who besides could have peopled this vast globe with so many living creatures of such different kinds, or provided them with all that is necessary to their life and well-being? Who but an Omnipotent Being could have supplied all the wants of the numerous animals that exist? Or who else could have given them so much sagacity and industry; so much address and instinct; assign to each living creature its peculiar element; form all the limbs, joints, bones, muscles, nerves, and vessels; unite them with so much harmony and perfection, that each animal can perform its different motions in the manner best adapted to its particular manner of life, and the circumstances in which it is placed!

AUGUST XXIII.

Division of the Earth.

All the known world is divided into four principal parts; Europe, Asia, Africa, and America. Europe is the smallest. Its length from east to west is about three thousand miles, and its breadth from north to south about two thousand five hundred. Its inhabitants possess various countries in the three other quarters of the globe, and nearly half the earth is under their subjection. The Europeans traverse every part of the globe, and receive the produce of every clime. They are the most enlightened of any people upon the earth, and cultivate the arts and sciences with the greatest success. Europe is the only quarter of the globe that is every-where cultivated, and covered with towns and cities; the only part whose inhabitants support an uninterrupted commerce with each other, and who profess, with only some slight variations, the same religion. The three other quarters are inhabited by a number of different people, who have little connection together, scarcely know one another, and differ as much in their manners as in their religion and mode of living.

Asia is the largest continent known; its length, from the Dardanelles on the west, to the eastern shore of Tartary, is four thousand seven hundred miles; and its breadth, from the southern extremity of Malacca to the most northern cape of Nova Zembia, is four thousand three hundred and eighty miles. As the countries situated in the interior of this part of the world are not visited by the refreshing sea-breeze, nor watered by many rivers—as they contain far-extending plains and barren mountains, the heat and the cold are both extremely intense; the earth has scarcely any fertility, and is never cultivated.

At present these regions are only inhabited by people who dwell in tents, and lead a wandering life, which seems to be rendered necessary by nature. The more settled inhabitants of Asia often suffer from the restless unquiet disposition of these wandering tribes. The northern part, which is full of lakes, marshes, and forests, has never been regularly inhabited. But the southern, eastern, and western parts, are the finest countries in the world; particularly those sinated towards the south; they are most luxuriantly fertile, producing in lavish abundance every thing that is necessary for the comforts of life.

Africa is a peninsula of very great extent; stretching from Cape Bona north, to the Cape of Good Hope, south, four thousand three hundred miles; and its breadth, from Cape Verd to Cape Guardafin, is three thousand five hundred miles. It is under the torrid zone, and contains vast sandy deserts, mountains of a stupendous height, forests burning beneath the ardent sun-beams, and monsters of every description. The excessive heat enervates all the faculties of the soul. We know very little of the interior parts of the country; and though so contiguous to Europe, very few well-regulated states have yet been discovered.

America, the largest division of the known world, and only discovered by Europeans within the last three centuries, is composed of two great continents, separated by a narrow isthmus, which is surrounded by a number of islands. The cold which reigns in the northern parts, the few useful productions found there, and its distance from inhabited countries, are the causes why it is not yet entirely known; but there is reason to believe that the natives are not civilised.

Forests and marshes still cover a great part of the country, and the eastern parts are the only ones cultivated. In South America there formerly existed considerable empires; the rest of the country was in-

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habited by wild people. The serpents, reptiles, and insects, are much larger than the greatest that are known in Europe. America contains the largest extent of country in the world, with proportionably the fewest inhabitants. If we calculate the number of leagues contained in these four parts of the earth, they will seem very considerable; and yet altogether they will not amount to the fourth part of the whole globe, which, great as it is, appears small when compared with the immense bodies in the heavens. It may, however, justly be regarded as a vast theatre where the wonders of God are continually displayed; and as we can know very little of the worlds around us, let us endeavour to become acquainted with that which we inhabit.

AUGUST XXIV.

Of the Nature and Properties of Light.

THOUGH we continually experience the utility of light, we cannot precisely determine its nature. All that the greatest philosophers have said of it is conjectural. Whether it is a fluid surrounding our earth, and which to become preceptible requires being agitated and put in motion, by the sun or some other inflamed body; or whether it is fire itself, which by the emanation of its infinitely subtle particles gently strikes the eyes at a certain distance; is still a question amongst philosophers: though the former hypothesis seems to be the most probable and the best supported. There is certainly a considerable difference between fire and light, the latter being infinitely more subtle; it instantly penetrates glass and other diaphanous bodies, whilst fire does it much more slowly, which proves that the pores of glass are large enough to admit light to pass freely, but obstruct the less subtle particles of fire, which also move much slower than light. When burning coals are brought into a room, it is slowly and gradually warmed; but the instant a lighted taper is brought in, the whole apartment is suddenly illuminated. From this and some other facts, we may conclude that fire and light are different substances, though generally accompanying each other, and one often producing the other.

The properties and effects of light are very remarkable. The rapidity with which it passes is prodigious; being only seven or eight seconds in its progression from the sun to the earth; in this short space of time traversing several millions of leagues. The observations of astronomers farther inform us, that the rays of a fixed star, before they reach us, must traverse a space which a cannon-ball, shot with the greatest velocity, could not pass through in less than one hundred and four thousand millions of years. The expansion of light is not less astonishing. The space though which it is diffused is not less than the universe itself, and too great for the human understanding to comprehend. This boundless diffusion of light enables us to discover the very remote bodies in the heavens; and could we obtain glasses of sufficient power, we might discern those which are still more distant in the vast regions of space.

Though our faculties are too confined to embrace all the designs of the Deity respecting the nature and properties of light, by investigating it with attention we may obtain considerable information upon so important a subject. Why, for instance, does light move with such velocity, and penetrate every part, but that a variety of objects may be perceived at the same time by a great number of people, and that distance may not prevent their being seen? If the propagation of the rays of light was slower, great inconveniences must result to the inhabitants of the earth; the force and splendour of light would be much diminished and enfeebled; the rays much less penetrating; and darkness would slowly and with difficulty be dissipated. Why are the particles of light so extremely subtle, but to paint the minutest objects upon the retina? Why have they not more density, but that they may not dazzle us by their splendour, and injure the eye by their power? And why are the rays so refracted, if not to enable us more easily to distinguish objects?

Thus we find the Creator and parent of mankind ever operates for our good and advantage, and all his arrangements are wise and beneficial. Had he not created light, we could not have enjoyed life; we should have been deprived of every external source of pleasure, and our understanding and improvement must have been reduced within very narrow limits.

AUGUST XXV.

Structure of Birds.

Birds may unquestionably be ranked amongst the most beautiful creatures of the earth. The form of their bodies, even in the minutest particulars, is so perfect and regular, as at once to convince us of the wisdom of the Creator. They have bones like the mammalia, but they are differently clothed. Their bodies are covered with feathers fastened to the skin, lying upon each other in regular order, and furnished with a warm and soft down. The large feathers are covered above and below with smaller ones, and each consists of a quill and beard. The lower part of the quill is hollow, and by it the feather receives its nourishment; towards the top it contains a kind of marrow. The beard is a range of small thin flakes, closely connected at the edges. Instead of having fore-legs like a quadruped, birds have wings composed of eleven bones, in the muscles of which the feathers enabling them to fly are fixed. The structure of these wings is very curious, and admirably adapted to their purpose. Between them the body is perfectly balanced, and placed in the most convenient manner for the different motions it has to perform. The heads of birds are small; by which neither the action of the wings nor the progress of the birds through the air are retarded. Their tails are useful in preserving their balance whilst flying, and to assist them to ascend and decend in the air. Their legs, from their particular situation, are well adapted to preserve the centre of gravity; and in some birds they are placed so far back as to enable them to swim. The thighs are clothed with muscles and feathers, whilst the legs are generally thin and without covering. Most birds have four toes, three before and one behind; at the end of which are claws, which they use to seize their prey and food. Some birds feed upon animals; others on plants, grain, and fruits, which they steep and soften in their crop; whence only a small part of the aliment passes at a time into the stomach, which in this species of birds is very small, and composed of very strong muscles; these assist in grinding the food, and small stones or gravel are also swallowed to promote digestion. The stomachs of birds of prey are much weaker.

All birds are constructed with such wisdom, that they are enabled to pursue their particular mode of living and obtaining food with great facility. The stork and the heron, which obtain most of their food in marshy places, have a long beak and long legs, that they may run into the water and readily seize their prey. The eagle and the hawk, which only live by rapine, are provided with large wings, strong claws, and sharp beaks. The bill of swallows is small and pointed, and their mouth large, to enable them to catch the insects which they meet when flying. The swan has a reservoir in its wind-pipe, whence it draws air while its head and neck are plunged under water seeking its food. Many small birds, which fly and hop amongst thickets, have a membrane over their eyes to defend them from injury. Each is perfect in its kind, and admirably constructed. The variety is very great and beautiful; and we must always admire the wisdom of God in this part of the creation, which we contemplate with such peculiar delight.

AUGUST XXVI.

Reflections upon the Sky.

WHOEVER attentively regards the heavens must be struck with admiration at the view of this magnificent work of the Creator. How beautiful is the azure vault suspended above the earth; in the day variegated by clouds, and by night resplendent with thousands of stars, and luminous with the moon's silvery radiance! We contemplate this grand spectacle with awe and sublime emotion; we consider with wonder the immensity of space, whose beginning and end we cannot discover, where orbs innumerable, of different degrees of magnitude, roll their spheres one beyond another in their prescribed circles, till distance forbids the eye to penetrate farther in the boundless expanse; and the mind owns its limited powers, whilst it ponders in silent astonishment upon the Supreme Being who made the heavens and the earth.

AUGUST XXVII.

Moral Reflections upon a Field of Corn.

As the corn-field, often threatened with danger, and exposed to the rude visitation of the tempest, is yet preserved in safety to yield its rich stores to the husbandman; so the human mind, visited by affliction, and shaken by the storms of adversity, still bears up against the blast, and is strengthened and purified by the fierce contention. In the moments of sorrow, when care and trouble oppress us, our knowledge, faith, and humility, are increased and confirmed; for though, like the tender stalk of corn, we bend whilst the blast sweeps over us, the compassionating hand of God gently raises and consoles our afflicted hearts.

The time of harvest approaches, the corn ripens fast, the sun's warmth and soft showers descend to hasten its maturity. May we also, as each succeeding day brings us nearer to our end, become more mature in all good, and prepare to be gathered unto our fathers in eternal glory. Whatever be our situation in this state of existence, whether cheered by prosperity, or darkened with impending evils; may all our actions tend to the glory of God, and the promotion of piety.

As those stalks which bear the largest and finest ears of corn bend beneath their treasure, whilst those which are poor and light stand erect and overlook the field; so we may observe men, vain and presumptuous, without knowledge and virtue, proudly hold up their heads, and contemptuously look down upon those whom religion teaches to be humble, and whose learning has estimated the limits of human attainment, and the insignificance of vanity.

All the corn which is to be reaped is not equally good tares and weeds are mixed with it: and so with men, they blend together both good and bad qualities; and their natural corruption often retards their progress in virtue. The dissipated and the wicked, by their pernicious examples, often sow tares in the field, where none but good seed ought to grow. The master of the field permits them to remain for a season, and patiently waits the arrival of the harvest before he exercises that impartial justice which separates the good from the bad.

The sickle mows down the corn, and the fruits of the earth are joyfully gathered. Death levels with the dust the rich and the poor, the high and the low, the wicked and the righteous; and happy will be the hour in which those who have preferred the pure light of religion to the delusions of error, are received into the regions of glory, and numbered amongst the spirits of just men made perfect. They will gratefully remember the storms, the dangers, the trials, and the afflictions, through which they have been preserved, and they will joyfully unite with angels in glorifying the God of heaven.

AUGUST XXVIII.

Shell-Fish.

SHELL-FISH, or testaceous animals, form a very considerable part of the animal kingdom. They live in shells formed of a calcareous matter. These are either univalve, of one piece; or bivalve, and multivalve, of two or several pieces. Testaceous animals form two great families: that of muscles, the shells of which are of more than one piece; and that of snails, whose shell is of one piece, and spiral. The structure of the former is the most simple. Muscles have neither head, horns, nor jaws; a mouth, windpipe, and sometimes a species of foot, is all that can be distinguished in them. The greater part of the snail-species have, on the contrary, a head, horns, eyes, and a foot.

Shell-fish differ considerably in their mode of generation. In some the sex may be discovered; others are hermaphrodites; and in some no particular sex can be distinguished. Some are oviparous; others viviparous. They are born with their shell: and as they grow, the shell, the interior of which is lined with a fine membrane, increases both in thickness and circumference. The shells are formed by a viscous liquid which exudes from the animal, and gradually thickens and becomes harder. Shell-fish live both in fresh water and in the sea; near the shore, as well as in the main ocean: some are carnivorous, and others eat vegetables: some keep at the bottom of the sea, or adhere fast to the rocks. Oysters, and some others with hard shells, attach themselves to different bodies, and remain firmly united to them by means of a glutinous gritty liquid; and they are often cemented fast to each other. This adhesion is voluntary in some shell-fish, which have the power of fastening themselves as occasion may require: but in others it is involuntary, and they always continue to the rocks on which they first fastened.

The knowledge that we have of these various animals is still very imperfect. As they generally live below the surface of the water, it is difficult to make exact observations upon their structure, mode of receiving nourishment, of propagating, and of moving, &c.; and as yet very few classes of them are known. But little as is our acquaintance with them, it is sufficient to make us admire the infinite grandeur of God. How immense is his empire! We every-where find creatures which testify his power and wisdom. How beautiful is the variety we observe in the form, richness, and colour, of shells, which human art can never equal!

AUGUST XXIX.

Upon the Government of God.

A God who, from his supreme elevation, could be an indifferent spectator of all the revolutions which take place in the world, would not be worthy of our homage. Happy for us, the government of the God whom we adore embraces the whole creation. We every-where find the centre of his empire, but can no-where discover its limits. All his works are continually before his view: he at once perceives the past, the present, and the future; and comprehends all their bearings and dependencies. Nothing, however trivial and minute, escapes his notice; every thing concurs to perfect the plan he has formed, and to complete his wise purposes, which all tend to the advantage and felicity of his creatures. All his laws are uttered in wisdom, and his commandments are a source of joy and happiness.

God, by his providence, preserves every creature which he formed in the beginning of the world. As one animal dies, another supplies its place; and one generation of men succeeds another. The Master of the world makes use of inanimate creatures to preserve those which live; he subjects all to man, who, of all created beings, is the only one that is capable of knowing and worshipping the Infinite God; who, all pure and holy himself, also wills that his rational creatures should know and feel the beauty of holiness. By the continual proofs which he gives them of his love for goodness, and abhorrence of evil, he speaks to their hearts, and unceasingly exhorts them to walk in the path of virtue: to this end he directs their actions, renders their designs abortive when they are contrary to his merciful views, and offers them the means of avoiding the snares of iniquity.

How infinitely wise were the measures which he used to conduct the children of Israel to the blessed ends that he proposed! In vain did the nations wrapped in idolatry oppose the progress, and conspire the destruction, of a people who marched under the eternal banners of their God, and followed a pure and holy religion, which pre-eminently distinguished them from, and raised them above, all the surrounding nations, blinded by superstition, and persisting in their errors.

The God of our faith dwells in light inaccessible; the wisdom of his government is too profound for human nature to penetrate; our understanding is not capable of comprehending all his plans, or to form just ideas of his views, before the event has unfolded them; and our knowledge is too limited to scan the counsels of an infinitely wise Being, and to discover before-hand the motives of his conduct and dispensations. The seat of the wicked is often with princes, whilst the righteous man hides his head in the dust: villainy triumphs, and integrity is oppessed; fortune smiles upon iniquity, and the friend of religion experiences dissappointment and adversity. Yet there is a Providence, a Father tender of his creatures, a God infinitely wise, a King just and righteous. All his dispensations are worthy of adoration, however impenetrable they may appear. His counsels are marvellous, his plans past finding out; but they are always formed and executed with supreme wisdom: and let us in silent reverence adore our God, and question not his ways, though affliction may visit, and misfortune bear heavy upon us.

AUGUST XXX.

Harvest Hymn.

Our fields, crowned with blossoms and ears of corn, are as a hymn of praise to the Creator; the joy which sparkles in the eyes of the reaper is a hymn to the God of nature. It is he who causes bread to spring out of the earth, and who loads us with his blessings. Come, let us assemble and sing unto our God; let his praise ever be the subject of our songs: let us listen to the glad voice which rises from the bosom of our fields. "The year shall crown thee with its blessings, O world, whose happiness is my work. I have called forth the spring, the harvest is the work of my power; the fields which support thee, and the little hills covered with corn, are mine." O Lord, we behold thy majesty, and feel the value of thy beneficence. By thee we exist; our life and preservation are thy gifts. Blessed be the fields that nourish man! Flourish, ye beautiful meadows! Be covered with thick foliage, ye forests! And thou, great God of nature, be ever beneficent towards thy creatures, and suffer thy children to repeat—the God of heaven is their Father!

AUGUST XXXI.

Thanksgiving for God's providential Care of his Creatures.

LORD God! my redeemer, my rock, and sure protector! Thou alone art worthy to receive glory, honour, and praise! My soul blesses Thee, and I will declare thy wonders. I will rejoice and be glad in Thee, and will celebrate the name of the most high God.

I thank Thee for that immortal soul which Thou hast given me; which Thou hast redeemed by thy blessed Son, and sanctified by thy grace.

Eternal Source of life and happiness! it is by Thee that I exist, and I will for ever bless thy holy name. I thank Thee for that parental care which provides my daily support, and for all thy numberless blessings. I thank Thee for those dear connections Thou hast enabled me to form; and for the glorious hope of finally experiencing, when my mortal career is terminated, the blessed inheritance of the just in the everlasting kingdom of joy and celestial beatitude, where my now feeble accents will join the loud anthem swelling from myriads of angels that harmonious sing thy praise in endless felicity.

SEPTEMBER I.

Hymn in praise of the Most High.

SING with holy rapture, sing a new song to our God. The Lord is great! Let us for ever celebrate that Being who is all good, all wise, and from whose eye nothing can be hid.

He has extended the starry sky, as a pavilion over our heads. There, encompassed by the radiance of innumerable suns, he has established his throne; there he dwells in light inaccessible to mortals.

O God, I am lost in this splendour; but thou, in thy infinite goodness, art continually present. Ravished with the wisdom of thy ways, and penetrated with admiration, I praise and exalt thy holy name.

I glorify thee, who governest the earth with paternal care, who enlightenest it by the beams of the star of day, who waterest it by the rains, who refreshest it by the dew.

Thou coverest it with smiling verdure; thou crownest it with flowers, thou enrichest it with harvests; and thou renewest its ornaments and blessings year by year.

Thy cares extend to all that exists, and the least of thy creatures is the object of thy benevolence. The young raven which cries to thee from the summit of the snow-capped rock, is sustained by thy hand.

Thou commandest the cooling stream to flow from the bosom of the desart mountains; thou orderest the sun to mature the vines which adorn our hills, and to ripen the fruits which enrich our orchards; thou sendest the breeze through our forests.

When thy sun arises to enliven the world with the splendour of his fires, he invites thy creatures to labour, every thing is active in nature till the moment in which the shade and the silence of night bring the desired repose.

But when the day begins to dawn, the choir of birds breaks the stillness of the grove with songs of gratitude and joy; then all the nations of the world, all the regions under heaven, lift up one concert of praise unto thee.

To thee they raise the voice of thanksgiving, Father of all beings! thou lovest them all; thou loadest them with thy gifts, thou hast designed all men for happiness, provided that they themselves wish to be happy.

May thy name be glorified throughout all the worlds which form thy empire! and let every voice conspire in one universal hymn to extol thee, the all-wise, the all-beneficent Deity!

SEPTEMBER II.

The Omnipresence of God.

THOU art every-where present, O Almighty God! Yes, thou art here, thou art afar off, thou fillest the universe. Here grows a flower; there shines a sun; thou art there, thou art also here. Thou art in the breeze, and in the tempests; in the light and in the darkness; in an atom and in a world. Thou art here

STURM'S REFLECTIONS

— how holy and perfect they shall be raised
into the clouds [illegible] 2.

in this flowery valley; thou lendest thine ear to my feeble accents, and thou hearest from the foot of thy throne the sublime songs which accompany the harps of the seraphim. O thou! who art the God of the seraphim; thou art also my God, thou hearest us both; thou hearest also the joyful notes which pervade the air from yonder lark, and the humming of this young bee which flutters on the rose. Omnipresent Being, as thou hearest me, deign likewise to grant my request; may I never forget that I am in thy sight; may I always think and act as being in thy presence, to the end that when summoned to appear at the tribunal of my Judge with the whole world of spirits, I may not be constrained to flee from before the face of the Holy of holies.

SEPTEMBER III.

The Beauty and Variety of Butterflies.

Let us observe these beautiful creatures whilst they yet enjoy their transitory existence; the examination may perhaps be interesting both to the mind and to the heart.

The first thing which attracts our attention on beholding these aerial inhabitants, is the clothing with which they are adorned. Yet some of them have nothing very striking in this respect to engage our notice; their vestment is plain and simple; others have a few ornaments on the wings; but with some those ornaments amount to profusion, and they are covered with them all over. Let us reflect awhile upon this last species. How beautiful are the gradations of colour which decorate them! What harmony in those spots which relieve the other parts of their attire! With what delicacy has nature pencilled them! But whatever may be my admiration when I consider this insect by the naked eye, how greatly is it augmented when I behold this beautiful object through the medium of the microscope! Would any one ever have imagined that the wings of butterflies were furnished with feathers? Nothing however is more true; and what we commonly call dust, is found in reality to be feathers. Their structure and arrangement are as full of symmetry as their colours are soft and brilliant. The parts which form the centre of those little feathers, and which immediately touch the wing, are the strongest; those, on the contrary, which compose the exterior circumference are much more delicate and of an extraordinary fineness. All these feathers have a quill at their base, but the superior part is more transparent than the quill from which it proceeds. If we lay hold of the wing too rudely, we destroy the most delicate part of the feathers; but if we remove all that we term dust, there remains only a thin, transparent skin, where may be distinguised the little orifices in which the quill of each feather was lodged. This skin, from the nature of its texture, may be as easily discerned from the rest of the wing as a fine gauze from the cloth on which it is fastened; it is more porous, more delicate, and seems as if embroidered by the needle; to complete its beauty, its extremity finishes by a fringe whose minute threads succeed each other in the most regular order.

What are our most elegant dreses, what is all their boasted ornament, in comparison of that refined tissue with which nature has invested this simple insect? Our finest laces are only like coarse cloth when brought to vie with that luxuriant cloathing which covers the wings of the butterfly, and our smallest thread, compared with their infinitely delicate fibres, appears like hempen cord. Such is the wonderful difference to be observed between the works of nature and those of art, when viewed through a microscope. The former are finished to all imaginable perfection; the others, even the most beautiful of their species, appear incomplete and coarsely wrought. How fine a piece of delicate cambric appears to us? Nothing more slender than the threads, nothing more uniform than the texture; and yet in the microscope these threads resemble hempen strings, and we should rather be tempted to believe that they had been interlaced by the hand of a basket-maker, than wrought on the loom of a skilful weaver.

What is most astonishing in this brilliant insect, is, that it proceeds from a worm whose appearance is mean and vile. Behold how the butterfly displays its gay wings before the sun: how it sports in his rays, how it rejoices in its existence, and flutters from flower to flower. Its wings present to us the magnificence of the rainbow. How beautiful is the butterfly now, which but a little while ago crept in the form of a worm in the dust, in perpetual danger of being crushed to death! Who has raised it above the earth? Who has given it the faculty of inhabiting the etherial regions? Who has furnished it with its painted wings? It is God; that sovereign Lord who is its creator and mine. In this extraordinary insect we are presented with an emblem of that transformation which awaits the righteous. Yes, the day will come, when quitting their present form, they shall cease to grovel upon the earth; when, holy and glorious, they shall be lifted above the clouds, and nothing limiting their flight, they shall soar beyond the stars.

SEPTEMBER IV.

The Growth of Trees.

Every tree, however luxuriant its branches may be, receives its principal nourishment from its lower parts; and it is probable that its juices circulate in a manner analogous to that of the blood in animals. The extremities of the roots form a prodigious mass of spongy fibres and of globules of air, which are constantly open to imbibe the juice which the earth affords them. This juice is at first only water impregnated with earthy matter; then, by means of a sort of milky substance, which is peculiar to each tree, and which distinguishes it from others, the juice acquires a nutritive quality before it ascends into those parts of the tree, which are elevated above the surface of the earth. We find by the aid of the microscope that wood, notwithstanding its hardness, is nothing more than an assemblage of an infinite number of minute, hollow fibres. The greater part of them, especially in shrubs, ascend perpendicularly; but in order to give more consistence to these fibres, there are in certain trees, particularly in such as are designed to be more strong and hard, tubes which extend horizontally from the centre to the circumference. Influenced by the heat of the sun, the sap rises, by degrees, into the branches and into all their minute and multiplied ramifications; in the same manner as the blood, issuing from the heart, is carried by the arteries and the veins to the most distant extremity of the animal body. When the sap has been sufficiently diffused through all the parts which required its circulation, the remainder of it fills certain large vessels which are placed between the inner and outer bark; and hence arises the annual growth and consequent thickness of the tree. To be convinced of this, it is sufficient to cut a branch transversely, by which we shall ascertain the age of the tree. Whilst the trunk from time to time increases in height and bulk, the roots continue a proportional growth, and gradually strike a deeper hold, and multiply their supporting fibres. As to the exterior bark, it seems destined to serve as a kind of garment to the tree, to unite securely together its component parts, and to preserve its more delicate but essential ones from external accidents and from the inclemency of the air.

Thus, has the all-wise Creator formed an admirable system of solid and fluid matter in order to give life and growth to those trees which adorn our plains, which lend their friendly shade to our flocks, to our shepherds, and to our cottages, and which afterwards serve so many purposes useful to man. Here we discover a wisdom which never fails, whilst it prescribes to nature laws in certain prospects, immutable, which act without interruption under the eye of Providence. A wisdom so profound, a skill so marvellous, so many preparations and combinations for each tree, ought to excite us more and more fervently to admire and venerate the creative hand. The contemplation of this wisdom is a most delightful study, and we shall find ourselves animated by it to glorify that God, who is so great in his counsels and plans, and so wonderful in their execution; the more we discover the traces of this wise Providence, the more shall we be impelled to commit all our interests into the hands of him who can never want means to turn every thing to the good of his creatures; the more, in fine, shall we be encouraged to raise our affections towards him, to supplicate him to enrich our souls with the gift of wisdom, and to make them grow in grace.

May we in our moral and intellectual progress resemble the growth of the trees! As they from year to year put forth new shoots towards heaven, as they extend around them fresh branches, laden with leafy honours, and with the richer burthen of nutritious fruits; so may our souls be gradually elevated to more heavenly heights: May they attain a continual increasing light, and in their intercourse with mortals, present a succession of virtue which shall for ever augment in brightness and in power! Whilst we are thus internally fortified to bear with firmness the storms of life, and whilst we are taught to receive them with salutary humility as visitants kindly sent from heaven to loosen us from the world, may we never find an emblem of our state in the ancient tree, which in proportion to its age always attaches itself the more strongly to the earth!

SEPTEMBER V.

The Ant-lion.

No insect is more remarkable for its dexterity than the ant-lion, though its figures announces nothing extraordinary. It nearly resembles the wood-louse; its body, which is composed of several membraneous rings, and terminated in a point, is provided with six feet. Its head, flat and square, is armed with two moveable, crooked horns, whose singular structure shews how admirable nature is, even in the least of her works.

This insect is the most subtle and dangerous enemy the ant has; the plans which he forms to ensnare his prey are very ingenious. He mines a portion of earth in the form of a funnel, at the bottom of which he waits to seize the ants which coming by chance to the edge of the precipice, are thence hurried down to their merciless foe. In order to dig it, he first traces in the sand a circular furrow whose circumference forms precisely the mouth of the funnel, the diameter of which is always equal to the depth he gives to his ditch. When he has fixed on the size of this opening, and traced the first furrow, he digs a second, concentric to the other, in order to throw out all the sand contained in the first circle. He performs all these operations with his head, which serves him instead of a shovel, and its flat and square form admirably adapts it to this purpose. He also takes some sand with one of his fore feet to throw it beyond the first furrow; and this work is repeated till the insect has reached a certain depth of sand. Sometimes in digging he meets with grains of sand larger than usual, or with little bits of dry earth which he will not suffer to remain in his tunnel; of these he disencumbers himself by a sudden and well-timed manœuvre of his head. Should he find particles yet larger, he endeavours to push them away with his back, and he is so assiduous in this labour that he repeats it six or seven times.

At length the ant-lion begins to enjoy the fruits of his toil. When his nets are once well laid, he has nothing to do but to put himself on the watch; accordingly, motionless and concealed at the bottom of the ditch which he has dug, he patiently waits for the prey which he cannot pursue. If any ant is inadvertently drawn to the borders of this fatal precipice, it generally rolls down to the bottom, because the brink is made sloping; and thus the sand giving way beneath its feet, the little insect is forced to follow the dangerous declivity till it falls into the power of its destroyer, who, by means of his horns, draws it under the sand and feasts upon its blood. When he has sucked all the juices from the body, he contrives to eject from his habitation the dry and hollow carcase; repairs any damage his trench may have sustained, and puts himself again in ambush. He does not always succeed in seizing his prey at the moment of its fall; it frequently escapes him, and endeavours to remount the funnel; but then the ant-lion works with his head, and causes a shower of sand to descend upon his captive, and precipitate it once more to the bottom.

All the actions of this little animal display an act so extraordinary that we might long examine them without being wearied. The ant-lion employs itself in preparing trenches even before it has seen the animal which it is to ensnare, and which is to serve it for nourishment; and yet its actions are so well regulated, that they could not be better adapted to accomplish these purposes.

How would an animal, so destitute of agility, have been able to entrap its prey more easily than by digging in a moveable sand and giving a sloping declivity to a funnel? What better stratagem could it have devised for recovering the ants which were on the point of escaping, even from this skilfully constructed snare, than in overwhelming them with showers of sand, and thus cutting off all hopes of a retreat? All its actions have fixed principles by which they are directed. The trench must be dug in the sand, or it could not answer the desired purpose: he must, according to the structure of his body, work backwards, and use his horns like a pair of pincers, in order to throw the sand over the brink of the funnel. The instinct which governs this insect discovers to us a first cause, whose intelligence has foreseen and ordained every thing that was necessary for the preservation and well-being of such an animal. The skill which it evinces is not the fruit of experience and of exercise; it commences with its existence. We must therefore seek its origin in the wisdom, the power, and the goodness of that Supreme Being who has proportioned the instinct of animals according to their several wants.

These considerations offer a new encouragement to glorify him, who is the creator of man as well as of the minute insect we have been contemplating! Beneficent source of life, thou lovest to diffuse it abroad, and thou hast formed this humble receptacle of it in such a manner that its existence shall be blessed; thou hast furnished all the means requisite to its enjoyment of life, and by the instinct with which thou hast endowed an animal, otherwise so impotent, it arrives at a skill, which approaches to reason, and in some measure, even surpasses it! And what has been the design in all this, but to furnish us, even by the most despicable creatures, with opportunities of knowing thee! To this purpose let us devote our studies of nature; and then every branch of them, however insignificant their objects may appear, will elevate our thoughts towards thee, who hast created the smallest worm as well as the huge elephant, and who extendest thy cares with equal benignity to the one and to the other.

SEPTEMBER VI.

Conformity between Plants and Animals.

It is often extremely difficult to determine the precise difference between plants and animals. Nature descends by imperceptible degrees from animal to vegetable existence; and to distinguish the exact limits of these gradations, nothing short of an angel's penetration would suffice. And we may remark, that notwithstanding all the differences between these two species of organized bodies, we may still find in them much resemblance.

The seed is to the plant, what the egg is to the animal. From the former springs the stalk which was before concealed under its coats; and the stalk makes an effort to raise itself out of the earth. In like manner, the animal, enclosed in the egg, breaks the shell, in order to breathe the open air. The eye or bud of the tree is, in the vegetable, what the embryo is in the animal kingdom: this eye does not pierce through the bark till it has acquired a certain thickness, and it then remains attached to it in order to receive nourishment from it as well as from the fibres of the plant.

The embryo, at the end of the appointed time, comes forth from the womb; and would soon perish, were it not sustained by its mother. The plant is supported by the alimentary juices which are brought to it from without, and which passing through various channels, are at length changed into its own substance. The nourishment of the animal is effected in a similar manner. It also receives its nourishment from without, and after having passed through different vessels, is transformed into animal substance.

The fecundation of the germ takes place in the vegetable kingdom when the dust of the stamina penetrates into the pistils; and fecundation amongst animals is produced when the seminal liquors penetrates into the ovaries or matrix. The multiplication of plants is effected not only by seed and by ingrafting, but also by slips. In like manner animals are propagated, not only by laying eggs, and bringing forth their young alive; but also by slips, as in the case of the polypus.

The diseases of plants arise from causes sometimes external, sometimes internal; and it is the same with those of animals. To conclude, death is common to them both, when old age having hardened and obstructed the vessels, the circulation of the juices is necessarilly stopped. Plants and animals are situated in the same places. The earth, both on its surface and within its bosom, the air, the sea and the rivers, are alike filled with animals and with plants Both are extremely numerous, though animal, rather than vegetable forms seem to bear the preponderance.

Thus one might be almost tempted to believe that animals and plants were beings of the same class, since nature seems to pass from one to the other by imperceptible degrees, and that even when she has risen by this gradation to the most obvious difference, she still connects the two orders together by a very striking similarity in all her principal operations. Of this at least we are certain, that some general and essential resemblances have been found in the two kingdoms, but that hitherto the truly characteristic differences have never been clearly ascertained. And though some should be discovered which have not yet been observed, we must always acknowledge that nature diversifies her works by gradations so fine and delicate that the human mind can with difficulty discern them: And who knows what discoveries may be reserved for posterity? Perhaps futurity will bring to light plants whose properties will approach still nearer to those of animals; perhaps some animals may be discovered which even more closely than the polypus will be allied to the class of vegetables.

Let us endeavour, to make that use of these facts for which all the truths of nature and of revelation are designed, even to draw from them continued incitements to glorify God, and to strengthen our minds in virtue. Let the great resemblance which we find between animals and plants render us sensible to the power and wisdom of that Being who on all his creatures has in some measure impressed the character of infinity. But, O man, learn to be humble. Thou participatest in the nature of plants, and in that of animals; to Jesus alone thou art indebted for thy elevation, and a much higher affinity, art lifted up from thy corporeal relation with the beasts that perish to a spiritual union with angels, whose perfections thou art called upon to imitate, with assurances that thy endeavours will be rewarded with a perpetual approximation towards their excellence.

SEPTEMBER VII.

The Nature and Properties of Sound.

SOUNDS are produced by means of the air; but it is necessary for this purpose that the air should be put into motion. Not that the agitation of the air alone occasions a sound, for in that case all wind would be attended with a noise. To produce sound, the air must be suddenly compressed that it may afterwards dilate and expand itself anew by its own elastic force. Thus a sort of tremulous undulation takes place, something similar to those waves and concentric circles which appear on the water after a stone has been thrown into it. But if this undulatory movement took place only in those particles of air which are compressed, the sound would not reach our ears. It is necessary, therefore, that the sonorous body after having made its impression on the air contiguous to it, should continue the impression from particle to particle, in a circular direction to all parts.

By means of this propagation, the last vibration is communicated to the air immediately surrounding our ear, and we have then the perception of the sound. With such amazing celerity is this chain of successive motions formed in the atmosphere, that sound is known to travel at the rate of a thousand feet in the space of a second, and in consequence a German league in twenty seconds. This calculation, which has been verified by a multitude of experiments, may be very useful in many cases; the knowledge of it contributes to our security in teaching us how far the thunder is distant from us, and consequently in apprizing us of our danger or safety in the place where we hear it roll. We have only to number the seconds, or to count the strokes of our pulse between the flash of lightning and the clap, and we may immediately ascertain the precise distance of the thunder-bolt. By the same means we may determine the respective distances of different places; as well as that which separates two ships. It is very remarkable, that a weak sound propagates itself with the same velocity as one that is strong. The agitation of the air is, however, greater in proportion to the strength of the sound, because a larger volume of air is put into motion. Sound is therefore loud when many particles of air are in motion, and weak when it is confined to a few.

But what benefit could we derive from those observations which philosophers have made upon the nature and properties of sound, if our bodies were not so constituted as to enable us to receive the perception of sound? Let us then praise God, who has not only disposed the air in such a manner as to produce sound by its vibrations, but has also given us an organ capable of receiving every sonorous impression, from the deep and awful roar of the tempest which rages over the billowy bosom of the sea, to the gentle whisper of the breeze which refreshes without agitating the fair and delicate forms of vernal nature.

A thin, elastic membrane, stretched at the bottom of the ear, like the parchment over a drum, receives the vibrations of air, and thus enables us to distinguish every species of sound. Thus far our knowledge of this subject extends; but if we inquire by what means, on the pronunciation of a word, our minds immediately form the idea of a word, and not of a simple sound; or why a tone can actuate our souls and create in them so many different notions, we are compelled to acknowledge our ignorance. Yet in this as in every thing else, where our reserches are shut in by the contracted limits of our finite nature, we ought to rest satisfied in the conviction of the wisdom and the goodness of our Creator. Had not sound existed, all mankind would have been mute, and alike inadequate to all the purposes of speech as the inarticulate babe which is yet insensible to the noble talent it will presently possess. By means of sound every creature is able to make known its wants or express its happiness.

Man derives from this privilege advantages to which no other animal can aspire. He can at once express all the sentiments of his heart, and excite what passion he pleases by certain modulations of his voice. God has not only conferred upon us the power of distinguishing sounds by the organ of hearing; he has also furnished us with the means of preserving this precious faculty. When one ear has become injured, the other refuses not its services, but in some measure performs a double duty, and supplies the place of its suffering companion; as all our powers, whether mental or corporeal, improve by exercise, and quicken in their sensibility of the different objects to which they are applied. When the sense of hearing loses its wonted acuteness, the acoustic horn is often found to be of great benefit. Should it even happen that the external auditory tube be injured, the internal one, which terminates in the mouth, may probably have continued unhurt.

Another source of comfort in that wonderful chain of blessings which takes its origin from the simple faculty of sound, is, the power of music. A multitude of harmonious instruments are formed to recreate and to charm us, and we listen with delight to their various tones, which we are enabled to discriminate with nicety and precision. Thus has our beneficent Creator condescended to minister even to our pleasures. With what grateful sentiments ought we then to approach his throne, inspired by the contemplation of those refined joys of which we are made [illegible]sceptible through the influence of music. May [illegible] recollection of so elevated a privilege never cease to impress our minds with the fervour of pious thank-fulness! May hymns pf gratitude be resounded far as sound can traverse and air continue its vibrations! May the universe echo to His praise, and heaven and earth listen to the wonders which Omnipotence has performed for man!

SEPTEMBER VIII.

The Mysteries of Nature.

WHEN men attempt to investigate things, and to penetrate into the causes of those effects which they have witnessed, they are compelled to acknowledge how weak and limited are their understandings. The knowledge we have of nature, of which we are sometimes so vain, extends little farther than to a superficial acquaintance with the effect of a few things which are immediately under our notice; and which we are able, in a certain degree, to apply to our own advantage. But to reach the causes of those effects, or to know how they operate. generally exceeds the grasp of our finite faculties. There are a thousand effects in nature which remain concealed from us; and in those which we are able to develope, a degree of obscurity almost always impedes our researches, and reminds us that we are but men. There are many phenomena of whose immediate causes we are ignorant; many others are doubtful; those which we do know are very few.

We hear the wind blow; we experience its powerful and various effects: but we know not exactly what produces it, what augments its violence, and what appeases it. From a small seed we see a plant spring with stalks and ears; but we know not by what means. Still less can we comprehend how a plant can spring from a small kernel and grow into a large tree, in the branches of which the birds make their nests; which covers itself with leaves and with blossoms to refresh and to charm us, which gives us fruit for our nourishment, and wood for our various wants and conveniences. All the aliments which we use, and which are of such different natures, are by an incomprehensible mechanism transformed within us into one substance; and this substance assimulates with our flesh and blood. We see the wonderful effects of the loadstone, and we believe that there must be a certain matter which operates in it: but whether it acts by an attractive power peculier to itself, whether it is a sort of fluid perpetually circulating about the loadstone, or whether it forms a kind of vortex, we are unable to determine.

We feel the cold, but hitherto no naturalist has found out the cause of its production. We know more respecting the nature of thunder and lightning than our ancestors did; but to ascertain what that electric matter is which displays itself with such sublime terrors in the storm, eludes our feeble perceptions. We know that the eye recognizes the images which are painted on theretina, and that the ear is susceptible of the vibrations of the air; but how shall we discern what those perceptions are and how they are formed? We are conscious of the existence of the soul in the body: but who shall explain the nature of their union and of their reciprocal influences? The effects of fire and of air are continually before us; but what is their precise nature, what are their integral parts, and how do they produce their different effects? In a word, on the greater number of objects we have no sure and incontestible principles to satisfy our inquirics: they begin with conjectures, and they terminate, at best, in probabilities. What are the hypotheses of philosophers but so many tacit confessions of the confined limits of their knowledge? At every step nature presents us with wonders which confound and astonish us; and however deep our reserches, however extensive our discoveries, still a thousand treasures of nature must ever remain covered with that mysterious veil which cannot be drawn aside by the efforts of finite reason. It is true we sometimes arrive at the power of giving happy explications to certain phenomena; but the principles, the first causes, their nature and their manner of operation, are always elevated above the sphere of our intelligence.

The mysteries of nature every day impart to us lessons of wisdom on the subject of the mysteries of religion. In nature God has put immediately within our reach the means of passing happily our temporal life, although he may have hid their sources from us. Thus also in the kingdom of grace, he has furnished us with the powers necessary to the attainment of a spiritual and eternal life, whilst yet the manner of their operation remains concealed from us. Nobody refuses to eat and drink because he is unacquainted with the composition of the aliments which preserve his life and strength: neither does any one neglect to sow or to plant because he has no just idea of the manner in which vegetation operates; nor shall we find any person so ridiculous as to reject the use of the wool which his sheep provide for him, merely because he knows not how it is produced. The extravagance of man rises not to this height. On the contrary, he is attentive to the productions of nature; experience shews him their utility, and he avails himself of it, with gratitude to his Creator. But how shall we account for a conduct so opposite to this with regard to the mysteries of grace? Why are disputes entertained on the nature of the means of salvation, on their efficacy, and their mode of operation, whilst they neglect that salutary application of them for which they are designed. Why are we not as wise in spiritual things as in those which are temporal, and which "perish with the using!" Instead of giving up ourselves to vain and idle speculations, let us be prevailed upon to lay hold of those gracious privileges which God has vouchsafed to us, and serve him with cheerfulness and fidelity. This is the purpose for which we are sent into a world replete with wonders, in a state of being which admits not of their solution, and not to trifle away our time in unprofitable researches and too curious disquisitions. If we meet with things which we cannot comprehend or penetrate, let us receive them with humility, and acknowledge in them the proofs of the feebleness of our understanding. It is sufficient that the advantage which accrues to us from the good use we make of them, convinces us that they are the work of a Being infinitely wise and beneficent.

God forbid that we should be so presumptious as to indulge the hope of being able to fathom the mysteries of nature or of grace; and let us be very careful not to censure what we cannot comprehend. Let us rather avow the weakness of our judgement, the blindness of our understanding, and in the deepest prostration of soul acknowledge the immensity of the Deity. Thus shall each mystery awaken adoration to that Being whose works are marvellous beyond human penetration, and whose wisdom infinitely transcends the brightest intelligence of man.

SEPTEMBER IX.

Eyes of Animals.

THE mere consideration of the eyes of different species of animals, is sufficient to convince us of the wisdom with which God has formed the bodies of his creatures. He has not given to all the organs of sight in the same manner, but has diversified them according to their different natures.

The eyes of most animals appear to be round; but even in this spherical figure there is considerable variety. Their situation in the head, near the brain, is subject to many variations. Man, and the greatest part of quadrupeds, have six muscles attached to each eye, by which they are enabled to move it from one side to another. The position of the eyes is such, that they can look straight forwards, and almost describe a half circle. But in this there is some variety. Horses, oxen, sheep, swine, and most quadrupeds, have a seventh muscle, to suspend and support the globe of the eye; and this is the more necessary because their head and eyes are inclined towards the earth, particularly when they feed.

The eyes of frogs differ from ours; for they can cover them with a transparent membrane, though of a close texture: this defends their eyes, and preserves them from the dangers to which animals in their particular way of life are exposed, living partly on land, and sometimes under water. Flies, gnats, and other similar insects, have a more perfect sight than other creatures; they have nearly as many eyes as there are apertures in their cornea; and whilst animals which have only two eyes, are obliged to turn towards the objects they design to perceive, by means of muscles; flies see very distinctly all round them without impediment, and without the necessity of moving their eyes, because one or other of these is continually directed towards the surrounding objects. Fish, which live in an element more dense than ours, could see nothing, and would be blinded by the strong refraction of the rays of light though they have two well-formed eyes, if their crystalline humour was not spherical, by which they are enabled the better to collect the rays of light. They have no eye-lids, and they cannot draw back their eyes: but their cornea, which is almost as hard as horn, preserves them from all danger. The mole was formerly supposed to be blind; but it is now discovered that it has extremely small black eyes, not larger than a pin's head. As this animal is almost always under ground, its eyes are defended from injury by being thus small, deep in the head, and covered with hair. The eyes of snails are placed at the extremities of their horns, which they can draw within their heads, or push out to discover distant objects. In some animals whose head and eyes are fixed and incapable of motion, this defect is compensated either by their superior number of eyes, or in some other way. The spider has four, six, and sometimes eight eyes, all placed in the front of a small round head without a neck; they are transparent and sparkling as diamonds. According to the mode of life and different necessities of certain species of spiders, their eyes are differently distributed in their head, that their sight may be extended to all sides, and that without moving their heads, they may discover the flies which they wish to ensnare. The camelion, a species of lizard, has the singular property of moving one of its eyes whilst the other remains motionless; of turning one upward whilst the other looks down upon the ground; and of seeing, at the same time, both what is before it, and what behind. We observe the same faculty in some birds, and in hares and rabbits, whose eyes are convex; this peculiar property preserves them from many dangers and enables them more easily to discover their food.

All these examples, and a much greater number might be given, evidently manifest the tender cares of Providence for the preservation of the most necessary organs. He has communicated the blessing of light to his creatures in different ways; and we are struck with admiration, when we consider the wonderful art displayed, and the precautions taken to preserve the possession of this precious organ, and to defend it from the dangers to which it is exposed. The situation of the eyes, their arrangement, number, and figure, in all animals could not have been differently disposed without the greatest inconvenience being felt. It is not merely for ornament and beauty, but for the benefit and advantage of the animals, that the Creator has made so much diversity in the structure and position of their eyes. Let the foregoing observations teach us to acknowledge and to celebrate the wisdom of God in all things; and seriously to consider the ends which he has proposed in the creation, that we may more and more magnify and exalt his power and goodness.

SEPTEMBER X.

Fish.

UNLESS we had seen fish, it would have been impossible to believe that such creatures existed. If a naturalist, who was only acquainted with land-animals, were told, that a species of creature inhabited water, so formed that they could live, move, and propagate, and fulfil all the animal functions in that element, would he not treat such information as unworthy of belief, and conclude from what happens to our own bodies when immersed in water, that it would be impossible for any animal to live and breathe long in a watery medium?

The way in which fish live, their structure, their motion, and propagation, are very curious, and afford fresh proofs of the wisdom and power of God. That animals may live in water it is necessary that their bodies be very differently constructed from those which live only upon land. And this peculiarity we find when we examine the exterior and interior structure of fish. Why have most fish a slender thin body, flattened on the sides, and pointed towards the head, but to enable them to swim, and more easily to cut through the water? Why are they covered with scales, if not that their bodies may be defended from the pressure of the water? Why are many fish, particularly those which are destitute of scales, enveloped with a smooth oily covering, but to preserve them from injury, and to keep them warm? Their bones are peculiarly light and flexible; their eyes are deep in their head, and their crystalline humour is spherical, that they may be secured from injury, and more able to concentrate the rays of light. Their fins are their only limbs, and by them they perform their different motions. By means of their tail fin, they move forward; their back fin directs the motion of their bodies; their breast fin enables them to rise, and their belly fin preserves their balance. The gills are their organs of respiration: they are placed behind their heads; and there are four of them on each side: of which the uppermost are the largest. They continually take in water by their mouth, which is their inspiration, and evacuate it through the gills, which is their expiration. The blood which proceeds from the heart, and which passes through the veins of the gills, does not return through the lungs to the heart, as in terrestrial animals, but is directly distributed to every part of the body. The organ most essential to fish in swimming, is the air-bladder inclosed in their belly, and communicating with their stomach. By means of this bladder, they can make their body more or less heavy; when it is inflated they become lighter, rise, and can swim near the surface of the water; but when it is contracted, and the air is compressed, the body becomes heavier, and sinks in the water. If the bladder is pricked with a pin, the fish immediately falls to the bottom and cannot again rise to the surface.

The immense number of fish, and their great variety of shape and size, also merit our attention. In the waters of Germany only, there are more than four hundred different species of fish, and how numerous must be the individuals of each species! Their figure also is much varied. We see among fish the greatest as well as the smallest animals. Some are long and fine as a thread; others short and broad; others are flat, round, triangular, &c. and some are armed with a horn; others with a species of sword; and others with a kind of saw. Some have nostrils through which they evacuate the superfluous water they have swallowed. We have in all this abundant cause to admire the power and wisdom of the Creator, so eminently displayed in the formation of these animals, and to be grateful for his goodness in giving them all for our use.

SEPTEMBER XI.

Of the Propagation of Animals.

It was once supposed that vermin, insects, and even some quadrupeds, were generated from putrefaction, without the interposition of other animals of the same species; but this opinion, so contrary to reason, is refuted by the most incontestible experiments. It is now generally understood that all animals are capable of producing others, and that this propagation is generally effected in two ways; by eggs, and by producing the young ones alive. All animals that give milk, or of the class of mammalia, are viviparous. All birds are oviparous; but their eggs, before they are capable of producing young creatures, must be impregnated by the male. In most animals it is necessary for the male and female to unite together;

fish only seem to be an exception to this rule. They have not been known to couple, but the male is supposed to impregnate the eggs after they have been spawned.

Fish are the most prolific of all animals; their multiplication is astonishingly great. It has been ascertained that the pike lays three hundred thousand eggs; the carp above two hundred thousand, and the mackarel near half a million. The eel is viviparous. Most amphibious animals propagate their species like others, except, that some of them resemble fish in this particular. Some are viviparous and others oviparous; the latter however do not hatch their eggs, but leave them to the warmth of the air, or water; and others deposit them in dunghills.

Worms are both viviparous and oviparous; most of them, if not all, are hermaphrodites, partaking of the nature of both sexes, with the power of self-impregnation. The distinction of sexes is very evident in most insects; though in some no sex can be observed; and others seem to combine both sexes in one body. Insects are generally oviparous; though some are viviparous. The eggs of the former are hatched by the warmth of the air. The insect called the leaf-louse, or blight, is viviparous; an insect of this species taken at the time of its birth, separated from all intercourse with insects of the same species, and shut up perfectly alone, will nevertheless produce young ones. This takes place in the following manner: In spring, and during summer, the females of this class of insects, bring forth their young without previous union of the male; they are then viviparous. A single one will produce a hundred more in less than three weeks. All that are born in this season are females; the males are produced in autumn; at which time they couple, and the females lay eggs, which are hatched in spring. Thus one junction of the male and female produces several generations, the individuals of which are impregnated in their mother's eggs also.

When we reflect on this variety in the propagation of animals, we must be convinced of the power and wisdom manifested in an extraordinary degree. The instinct which leads the two sexes to unite together is truly admirable; and is a natural propensity, not produced by any external or adventitious circumstances. Most animals have a precise time for bringing forth their young; and every thing that is known with respect to this part of the animal œconomy, displays an equal wisdom with the rest of nature's works; and we have great reason to be thankful that the different species of animals are preserved by means of that instinct, which induces them, at certain periods, to unite together for the preservation and continuance of their race.

SEPTEMBER XII.

Influence of the Moon upon the Human Body.

FORMERLY certain influences were ascribed to the moon, tending to nourish superstition and occasion idle fears. The gardener would not plant till he had made observations on the moon, and the husbandman would not sow till he was assured of the happy influence of this planet. ' Those who were sick, paid a strict attention to the variations of the moon, and even physicians regarded their influence as an object worthy of notice. As knowledge became more generally diffused, these prejudices began to disappear; and the influence of the moon is no longer considered so powerful and universal an agent in nature as was formerly imagined. The present age is less superstitious than the last; and it is the duty of every man to use all his exertions in separating truth from error, and, to rescue his fellow-creatures from the despotic sway of blind superstition. With regard to the effects of the moon upon the human body; some caution is requisite before we pronounce a decided opinion upon it; for totally to deny such an influence would be as irrational, as to attribute to it a very great power and action. We must allow that the moon produces great changes in the air, and hence may occasion certain alterations in our bodies. The moon may cause in the superior part of the atmosphere such considerable motions, and alterations, as to produce winds, heat, cold, exhalations, mists, &c. by which the health of our bodies may be greatly affected. It is observed that people labouring under certain infirmities, experience exacerbations, and more acute pains, at the new and full moon. And if it is true, that a cold moist air, and foggy stormy weather, have very different effects upon the body than a warm, dry, and serene air, it is by no means surprising that the moon has an influence upon our constitution, seeing that it so considerably affects the state of the air. The action then of this planet upon the human body cannot be disputed, because it is founded on a certain principle, which is, that our health greatly depends upon the weather, and the constitution of the air we breathe, and these are materially affected by the moon.

In general we ought to admit it as a principle, to the glory of our Creator, that in all natural things, there are certain connections which influence the animal economy in various ways. There are doubtless in the atmosphere many wonders unknown to us, and which may occasion considerable revolutions in nature; and there may certainly occur many phenomena in the corporeal world which are influenced by the moon. The light reflected from her during the night is probably one of the least of the purposes she answers; and her being placed so near to the earth, was perhaps to produce certain effects upon it, which the other planets could not do, because of their greater distance; for we have reason to believe that every thing in our system has some relation to our globe. The beauty of the universe consists in the diversity and harmony of the several parts which compose it; in the nature of their effects, and in the total of happiness which results from the various combinations. If then we believe that God has arranged all, and established the connections which exist among the spheres, we shall banish from our minds every superstitious fear of the influence of the moon and planets; and shall no longer suffer vain terrors to pervade our hearts; but we shall be convinced such ideas are contrary to divine wisdom; and as we become persuaded that he who governs all things with infinite goodness and power, operates only for the happiness of his creatures, we shall confide in him with certainty, and repose upon his parental regard with joyful and heartfelt gladness.

SEPTEMBER XIII.

The Mineral Kingdom.

We require many materials to enable us to procure wholesome and convenient dwellings. If these materials had been scattered over the face of the earth, considerable inconvenience would have been experienced, and plants and animals would scarcely have had sufficient room. But happily our earth is free from such incumbrance. Its surface may be traversed by its inhabitants, or cultivated, without any hindrance. Metals, stones, and several other substances which we continually use, are inclosed beneath our feet in immense receptacles, whence we extract them when we want them. These bodies are not concealed in the centre of the earth, nor are placed at an inaccessible depth; they lie beneath the surface, which covers them as a dome, and which whilst it is sufficiently thick to produce nourishment for man, is thin enough to be readily dug through, so that we can obtain the substance contained in these vast store-houses of nature.

All the substances in the mineral kingdom may be divided into four classes, each having its distinguishing characteristic. The first class includes the earths. This name is given to such bodies as are not dissolved by water, fire, nor oil, which are not malleable, and bear the action of fire without losing any of their substance. This class, besides the simple earths, includes the stones which are composed of them. Of stones there are two kinds, precious and common: the latter are the most numerous, and present us with masses differing in figure, colour, size, and hardness, according to their component parts. There is also a considerable diversity amongst precious stones. Some are perfectly transparent, and these appear to be the most simple; others are more or less opake, according to their particular composition.

Salts form the second class in the mineral kingdom. They are divided into acids, which are sharp and sour; and into alkalies, which impart to the tongue a bitter, burning, and lixivial sensation; these have the property of changing vegetable blues into greeen, whilst the acids convert blue into red. A certain combination and mixture of these two different salts, forms what are called neutral salts. Amongst these is classed common or kitchen salt, which is extracted from the earth, or prepared from sea-water by evaporation. All these salts are one of the principal causes of vegetation. They also probably serve to unite and strengthen the parts of plants, as well as of other compound bodies: and they produce fermentation; the effects of which are so various.

The third class of the mineral kingdom, comprehends those inflammable bodies, which are generally called bitumens. These burn in the fire, and when they are pure, dissolve in oil, but never in water. They differ from other minerals, by containing more of inflammable matter, which renders those bodies, in which it is found in a sufficient quantity, combustible; and there is more or less of it in all bodies.

The fourth class contains the metals. These are the heaviest of all bodies; they become fluid if exposed to the action of a strong heat, and resume their solidity when cooled. They are resplendent, and malleable. Some of them when melted in the fire, experience no diminution of weight, nor any sensible alteration; and these are called the perfect metals; of which there are three species, gold. and silver, and platina. The imperfect metals are destroyed more or less readily by the action of the fire, and are converted into oxides. One of these, lead, has the property of being converted into glass, and of vitrifying all other metals except gold and silver. The imperfect metals are five in number, viz. mercury or quicksilver, lead, copper, iron, and tin. There are, besides, other metals distinguished from these in being neither ductile, nor malleable; these are called semi-metals, and are seven in number, platinum, bismuth, nickel, arsenic, antimony, zinc, cobalt*.

The whole mineral kingdom may be regarded as the work-shop of nature, where she secretly labours for the benefit of the creation; but we are ignorant of the way in which she operates; and we cannot discover how she forms the various substances which she presents to us. We are not well acquainted with the surface of the earth, much less do we know the interior. The deepest mines are not more than six hundred and thirty fathoms below the surface, and that is not the six-thousandth part of the earth's diameter. This alone is sufficient to convince us of the impossibility of having an exact knowledge of the nature and formation of the various substances in the mineral kingdom. But fortunately in the use which we make of the gifts of nature, it is of little consequence whether or not we are exactly acquainted with their origin and first principles. It is sufficient for us to know how to apply them to the most beneficial purposes; and we know enough of them to be convinced of the glory of the Creator, whose power, wisdom, and goodness, are manifested in every thing above or beneath the earth.

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* The division of metals into perfect and imperfect, into metals and semi-metals, is now generally discarded. Since the author wrote the above, more metallic substances have been discovered, and for the readers information I have inserted from Thompson's Chemistry the following more complete arrangement.

SEPTEMBER XIV.

Exotic Plants.

Men never regard with sufficient attention the gifts of God, particularly those which come to us from

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I. *Malleable.*	II. *Brittle and easily fused.*	III. *Brittle and with difficulty fused.*
1 Gold	1 Bismuth	1 Cobalt
2 Platinum	2 Antimony	2 Manganese
3 Silver	3 Tellurium	3 Tungsten
4 Mercury	4 Arsenic	4 Molybdenum
5 Copper		5 Uranium
6 Iron		6 Titanium
7 Tin		7 Chromium.
8 Lead		
9 Nickel		
10 Zinc		

distant countries. If we considered how much labour and industry are required before we can obtain a little sugar, or cinnamon, we should not receive the gifts of nature with such unconcern as we generally do; but we should look up with gratitude to that Supreme Being who makes his blessings flow to us through so many channels. At present let us consider those foreign productions which have become so necessary to us, and without which we should feel much inconvenience. From such a consideration useful reflections may arise, and we shall probably regard with more pity our unfortunate brethren who are condemned to slavery; and whose severe labours procure us so many luxuries.

Sugar is found in a certain reed which is principally cultivated in Brazil and the neighbouring islands; and it also abounds in the East Indies, and some of the African islands. The preparation of sugar does not require much art; but it is very laborious, and is chiefly performed by slaves. When the canes are ripe they are cut down, and carried to the mill to be bruised that the juice may be extracted from them. This juice is first boiled, by which means it is prevented from growing sour and fermenting. When it boils, they skim it to take of all impurities; and this boiling is repeated four times in four different vessels. Still further to clarify and purify it, they throw into it a strong lye of wood ashes and quick-lime; and lastly they cast it into moulds that it may coagulate and dry.

Tea is the leaf of a shrub which grows in Japan, China, and other parts of Asia. These leaves are gathered two or three times during the spring. Those of the first gathering are the finest and most delicate, and constitute what they call imperial tea; but it never comes to Europe; that which the Dutch sell under the name is only the second gathering.

Coffee is the kernel of a fruit resembling a cherry. The tree which bears it is a native of Arabia, but it has been transplanted into many warm countries. Next to Arabia it flourishes best in the island of Martinique. The kernel which is found in the middle of the fruit is called a berry; when fresh it is yellowish, grey, or pale green, and it preserves this colour when it is dry. The fruit is spread on mats for the purpose of being dried in the sun; it is then bruised with rollers that the fruit may be separated from the kernel; and hence it is that each berry is divided into two halves. The kernels are dried a second time before they are shipped.

Cloves are the buds or dried blossoms of a tree which formerly grew without culture in the Molucca islands; but the Dutch have since transplanted it to Amboyna. The tree itself resembles the laurel in size and form; its trunk is covered with bark like the olive tree. White flowers grow from the extremity of the branches. At first the buds are of a pale green, they then become yellow, afterwards red, and at length of a dark brown such as we see them. They have a more penetrating aromatic odour than the mother clove, which is the dry fruit of the same tree.

Cinnamon is the second or inner bark of a species of laurel or bay-tree which grows chiefly in the island of Ceylon. The root of the cinnamon-tree is divided into several branches, and is covered externally with a greyish bark; but the inner bark is red. The leaf would resemble that of the laurel, if it was shorter and less pointed. The flowers are small and white, with an agreeable fragrance like that of the lily. When the tree has attained some years growth, the bark is stripped off, and the outer bark being good for nothing is thrown away; the inner bark is dried in the sun and rolled up in sticks, and is then what we call cinnamon.

Nutmegs and mace are the produce of a tree which grows in the Molucca islands. The nut is covered with three rinds. The first of which falls of when the nut is ripe; and then the second, which is very thin and fine, appears; this is detatched with much precaution from the fresh nut, and exposed to the sun to dry. In the Molucca islands it is called mace, and here it is erroneously termed the nutmeg blossom. The third bark immediately covers the nutmeg itself, which is taken out of its shell and put into lime-water, where it remains for some days, and is then sufficiently prepared for exportation.

Cotton grows in most parts of Asia, Africa, and America. It is the fruit of a kind of pod, which when ripe, opens and presents a flock of extremely white down, and this is called cotton. When the pod is swelled by the heat, it becomes as large as an apple. By means of a little mill they make the seed fall on one side, and the cotton on the other. It is afterwards spun for different works.

Olive oil is the expressed juice of the fruit of the olive-tree, which is very abundant in France, Spain, Portugal, and Italy. The inhabitants of the countries where these trees abound, make us of the oil instead of butter, because the grass being withered by the heat, they are not able to keep many cows.

Pepper is the fruit of a shrub whose stalk requires a prop to support it. The wood is knotty like the vine, to which it bears a near resemblance. The leaves, which have a powerful smell, are oval, and terminate in a point. In the middle and at the extremity of the branches are white flowers, whence the fruit grows in bunches, each fruit bearing from twenty to thirty pepper-corns.

It is highly pleasing to reflect upon the great variety of aliments designed to afford us pleasure, as well as support. The grateful mind loves to consider those blessings which the divine bounty has so abundantly bestowed upon us. Every country contributes to our necessities and comfort; the most distant climates yield us their rich stores, and whilst we enjoy them at our ease, let us not forget those suffering and hard-labouring people, who have been torn from their homes, and seen their dearest ties snapped asunder, to drag out a miserable existence in providing for the luxuries of men, who call themselves Christians.

SEPTEMBER XV.

The Strength of Man compared with those of Animals.

THOUGH the human body appears to be more delicate than that of most animals, it is yet much stronger in proportion to its size than that of the most vigorous animals. A man's strength is best estimated by the weight he is able to carry. If it was possible to unite in a single point, or in a single effort, all the strength that a man exerts in a day, it would be found that the weight he could lift every day a foot from the ground, without injuring himself, would be equal to one million seven hundred and twenty-eight thousand pounds. Men accustomed to hard labour can generally carry a burthen of one hundred and fifty or two hundred pounds weight, without much exertion; and common porters often carry loads from seven to eight hundred pounds weight. The size of a man's body, in proportion to that of a horse, is as one is to six or seven; if then the strength of the horse was proportionate to that of a man, he ought to be able to carry a load of twelve or fourteen thousand pounds weight. But no horse can carry so much; and allowing for the difference of size, his strength is only equal, if not less than that of a man. A French experimentalist has ascertained the strength of the human body, by having a sort of harness made, by means of which he placed on every part of a man's body, standing upright, a certain number of weights, in such a manner, that each part of the body supported as much as it could bear relatively to the rest, each having its proper porportion of the load. By means of this machine, a man supported a weight of two thousand pounds, without being at all over-loaded.

We may also judge of a man's strength, by the continuance of his exercise and the agility of his motions. Men, accustomed to hunting, will outrun horses, and can continue the chace longer; and even in a more moderate exercise, a man accustomed to walking will travel each day further than a horse can. At Ispahan, couriers go nearly thirty leagues in ten or twelve hours. Travellers inform us that the Hottentots overtake lions in the chace, and that the American Indians pursue the elk with such rapidity that they tire it, and then seize it, though this animal is as swift as the stag. Many other remarkable things are related of the fleetness of the Indians, of the long journies that they perform on foot, over the most rugged mountains, and through countries where there is no track or road. It is reported that these men perform journies of a thousand or twelve hundred leagues, in less than six weeks, or two months. What other creature, except birds, can undertake such long journies? Man in a state of civilization does not know how much strength he possesses, how much he loses by effeminacy, nor how much he can acquire by frequent exercise. Sometimes we find men of a very extraordinary strength; but this gift of nature, which would be so valuable if they were obliged to employ it in self defence, or in useful labour, is of little advantage in a civilized state, where the powers of the mind are of much more avail than bodily strength, and where manual labour devolves on the lowest classes of society.

Here again we may acknowledge the admirable wisdom with which God has formed our body, and rendered it capable of so much activity. We cannot but regard with pity those indolent beings who pass their lives in idleness and effeminacy; who never exert their strength, nor exercise their powers, for fear of injuring their health, or shortening their lives. Why has the Almighty blessed us with strength, unless that we may employ it to some useful purpose? When, therefore, we dissipate it in indolence and in inactivity, we oppose the will of our Creator, and become guilty of the basest ingratitude. Let us, in future, exert all our powers, and apply our several faculties for the good of our fellow-creatures, according to our situation and circumstances, and if necessity requires, let us cheerfully earn our bread by the sweat of our brow; even then our happiness is greater than that of thousands of our fellow-men, who groan beneath the insufferable yoke of slavery, and who when worn out with labour and fatigue, and their strength is exhausted, have no means of procuring ease and comfort for their opressed bodies, nor no soothing voice of kindness to cheer the sad moments of sickness, or encourage their drooping soul; hope is denied them, and their only consolation is the silence of the grave. The more happy we find our lot compared with these unfortunate victims of luxury, the more seriously ought we to apply ourselves to fulfil our duties; and the success of our labours should induce us to love and to praise God, who has vouchsafed to grant us strength and ability, and graciously continues to preserve them.

SEPTEMBER XVI.

Instinct of the Butterfly in the Propagation of its Species.

his is the season of the year, when butterflies begin to disappear from the creation; but the race is not extinct; they live again in their posterity, and by a wonderful instinct, they provide for the preservation of their species. From the eggs which they lay, new generations arise; but where do they place them at the approach of the rigorous season, and how do they defend them from the autumnal rains, and the penetrating frost of winter? Are they not in danger of being frozen or drowned?

That beneficent Being, who gives wisdom to man, has also condescended to instruct the butterfly how to secure the only legacy it can bequeath to the world, by covering its eggs with a glutinous substance which is secreted by its own body. This sort of glue is so tenacious, that rain cannot penetrate through it, and the ordinary cold of winter cannot destroy the young ones contained in the eggs. It is worthy of remark that though each species always follows the same method from generation to generation. there is still more diversity in the means which different species take for the preservation of their race. Naturalists have informed us, that some of these insects lay their eggs at the beginning of autumn, and die soon after, whilst covering their tender young. The sun warms their eggs, and before winter a number of little caterpillars are hatched; these immediately begin to spin, and with their thread make themselves nests and very commodious lodgings, where they pass the cold season, without eating, and nearly without motion. It is also remarkable that the butterfly, like other insects, only lays its eggs upon those plants which agree the best with its young, and where they may find the necessary nourishment: so that as soon as they are hatched, they are surrounded by the aliment which is most proper for them, without being obliged to remove at a time when they are too feeble to undertake long journies.

All these, and many more circumstances of a similar nature, are calculated to make us admire the wise arrangements of an all-preserving Providence. If we do not require miracles, and things contrary to the usual course of nature, to affect and render us attentive, the consideration of the cares which these insects have for their offspring, so diverse in different species, but always uniform and constant in each individual, would fill us with the greatest admiration.

Let us, who are rational beings, learn from these insects to cherish in our hearts a love for our children, and to interest ourselves for the benefit of those who are to succeed us on the stage of life. Let not the fear that death may surprise us in the midst of our labours, divert us from forming great projects, or undertaking noble enterprizes; remembering that in thus devoting ourselves to the public good, we only repay to posterity, the debt we owe to our ancestors. If parents of children were to imitate the female butterfly, which provides for the little ones which survive her, they would never leave their helpless children in want, but would place them in such a situation, that when the parents ceased to live, their children should have no other cause of sorrow, than the loss of a kind father, or of a tender mother. Though we cannot foresee, much less prevent, those misfortunes and contingencies to which they are liable, we ought certainly to take care that their future condition in life is not unhappy by our neglect. Would to God, that all parents were concerned, as becomes them, for the future welfare of their offspring; that they would not leave their families in disorder and confusion; and that they would do well to regulate their domestic affairs, that after their death, their unprotected children might not be exposed to vexatious embarrassments, nor witness their inheritances enjoyed by strangers, and their property consumed by law-suits!

SEPTEMBER XVII.

The Vine.

To be convinced how unreasonable and absurd it is to complain of the inequalities of the earth, we need only consider the nature of vines. The vine never succeeds well in a flat country, neither does it thrive on every hill, but only on those which have a south or east aspect. The highest hills and steeps, where the plough never reaches, are yearly covered with verdure, and produce the most delicious fruits. If the soil which nourishes the vine appears poor and destitute, the wine-producing plant appears equally unpromising. Indeed had we not known it by experience, we could scarcely have believed that a seemingly dry and mean wood should produce such a delicious liquor. The evaporation from the vine is so considerable, that one hundred and fifty-two inches of sap are required to rise in the space of twelve hours, to supply the fluid which exhales through the leaves.

Much wisdom is displayed in the distribution of vineyards, over the earth. They do not succeed alike in all places; to thrive well they should be situated between the fortieth and fiftieth degrees of latitude, consequently about the middle of the globe. Asia is properly the country of the vine, whence its cultivation has been gradually introduced into Europe. The Phœnicians, who at a very early period traversed the coasts of the Mediterranean, brought it to the continent and most of the islands. It succeeds remarkably well in the island of the Archipelago, and was at length brought to Italy, where it multiplied considerably; and the Gauls, who had tasted of the grape juice, wishing to establish themselves in the country where it was produced, passed the Alps, and made themselves masters of both banks of the Po. The vine was soon afterwards cultivated throughout France, and flourished upon the banks of the Rhine, the Moselle, the Necker, and in different provinces of the German empire.

The consideration of the vine may give rise to some very important reflections. As the most barren soils are good for the cultivation of the vine, so it sometimes happens that the poorest countries are favourable to science and wisdom. In provinces universally despised for their poverty, men have arisen, the rays of whose genius have beamed upon distant countries. There is no place so desert, no town so small, nor village so miserable, as entirely to preclude the successful cultivation of science: all that is required for its increase is encouragement. What an inestimable blessing, then, we have in our power to procure, if we only will give ourselves the trouble of cherishing the virtues of the human heart, and improving those mental powers which we possess for the noblest purposes! Sovereigns, pastors, and teachers of youth, how essentially might you contribute to the happiness of your fellow-creatures, and of your remotest posterity, if by proper exhortations, rewards, useful establishments, and adequate encouragement, you endeavoured to restore religion, science, and all the social virtues, into ruined cities, and desolate villages! Efforts like these can never be entirely useless. If we ourselves do not receive the recompense of our labours in seeing them attended with present success, our descendants will at least receive the fruit of them, and we shall be ranked amongst those excellent characters, who by being the benefactors of the human race, have obtained the approbation of God, and the benediction of their fellow creatures.

The vine, with its dry and shapeless wood, is emblematical of those men, who destitute of the honours of birth, and the splendour of rank, still do much good. How often it happens that men born, and living in obscurity, whose external appearance promises little, perform actions, and undertake enterprises, which raise them above all the princes of the earth. And here we may reflect with advantage upon Jesus Christ himself; to judge of whom, from the mean and abject state in which he appeared when personally on earth, we should not have expected those great and wonderful works which have made him the Saviour of mankind. He has shewn to us that we may be poor, despised, and miserable in this world, and yet successfully labour for the glory of God, and the good of our fellow-creatures.

SEPTEMBER XVIII.

Hymn to celebrate the Works of the Creation.

Praise ye the Lord! Let all tongues and people celebrate him with songs of joy! Sing aloud, and exalt his power and goodness! Adore him, ye nations, prostrate yourselves before him, ye islands! Praise and glorify the supreme ruler of the universe!

It is he whose power drew forth out of nothing, the elements, the heavens, and light itself: it is he who separated the earth from the bosom of the waters; and his almighty hand formed the sea, and all the innumerable host of creatures which live upon his bounty.

It is he who has given light and heat to the sun; who has prescribed laws to the moon; who has marked out to the stars their course; and who flashes in the lightning, and speaks in the thunder! It is he who bids the tempest roar; and the strength of the lion, and delicate structure of the insect, are monuments of his power. To gladden the hearts of men, he has taught the nightingale to warble her melodious strains; he gives to the flowers their fragrance: he balances and puts in motion the air; he calls forth the winds and directs their course. The sea at his powerful word swells in billows, and again subsides at his command; for God reigns in the bosom of the deep. Let us then bow down before, and adore, the Supreme Being, whose grandeur is manifest in all his creatures; and the traces of whose infinite power the whole creation declares.

SEPTEMBER XIX.

Wonders which God daily effects in the Creation.

The whole universe, which continually preserves that beauty and order in which it was first established, is a miracle constantly before us. How astonishing is the world which we inhabit! How immense is the number, grandeur, variety, and beauty of the creatures which it contains! What other arm than that of the omnipotent God, could have placed in the immense expanse of the heavens, the sun and all those stars, whose prodigious size and distance fill our minds with astonishment! Who but God has prescribed to them the spheres in which they have revolved for thousands of years? Who else has determined with such skill, the respective powers of all these globes: and established a perfect balance between them and the æther in which they are suspended? Who has placed the earth at such a just distance from the sun, that the space between them is neither too great nor too small?

The alternation of day and night; the revolutions of the seasons; the innumerable multitude of animals, of reptiles, of trees, of plants, and of all the different productions of the earth, are the works of the Almighty God. His particular and especial providence is a continual proof of his greatness, wisdom, and omnipresence. His constant cares for us, and that marked protection, instances of which almost every person has met with: the various means he employs to attract men to his service; the ways by which he leads them to happiness; the misfortunes which he tries them with, to awaken them and bring them to a sense of their situation; the extraordinary events which he orders for the good of his empire; events which are commonly produced by slight causes, and in circumstances which seem to render them impossible; the great revolutions which he effects, to make his holy truth, and the knowledge of himself, pass from one country of the earth to another; are all so many effects, in which we ought to acknowledge his constantly-acting power, and which, if we were sufficiently attentive, would make us say with the Psalmist, "This is the Lord's doing; and it is marvellous in our eyes."

Let us be attentive to what passes before us, and we shall every where discover the traces of a God; if we shall see that by the ordinary means of his grace, he continually works for our sanctification; that his divine word continually dwells amongst us, and that his saving voice may be continually heard. Surely those who refuse to listen unto him; who resist the impulse of his Holy Spirit, and who do not yield to his merciful visitations, would not be converted though new miracles were wrought in their sight. Ought not man who sees that God has created the world, which every where presents to him so many wonders; man who is constantly receiving the blessings of heaven, and who owes to God all the advantages which he enjoys, ought he not to believe, to love, and to obey him?

Yet he resist—What then can affect him, or whom will he not oppose?

Let us then who daily witness the wonders of our God, pay attention to them, and no longer harden our hearts against truth. Let not prejudice nor passion prevent us from reflecting upon the admirable works of God. Let us contemplate the visible world, and reflect upon ourselves, and we shall find sufficient causes to acknowledge him who daily works miracles before us; our souls possessed with these grand ideas, we shall cry out with rapture and admiration, "Praise, honour, and glory be ascribed unto God, the author of all good, and the redeemer of our souls; who alone performeth wonders, and who visiteth the heart of man with comfort and sweet consolation; who poureth balm into our wounds, supports us in affliction, and wipes the tear from every eye; unto that God of all mercy be rendered love, gratitude, and adoration for ever and ever through the countless ages of eternity."

SEPTEMBER XX.

Digestion of Food.

DIGESTION is an admirable and complicated process, which we daily perform without knowing how, and even without giving ourselves the trouble of learning what is most remarkable and essential in a function so important to the human body. It is well for us that digestion may be carried on, though we are ignorant how it is performed; but it is always preferable to be acquainted with the process, and to have some knowledge of the operations of nature in this respect.

When the food has been sufficiently masticated, and divided by the teeth into small portions, and moistened by the saliva, it is prepared to pass into the throat. This is the last function, relative to digestion, in which the will assists; all the rest is done without our being conscious of it, and without our being able to prevent the process going forward. As soon as a portion of food enters the throat, it pushes the mass onward, and causes it to descend into the stomach by a peculiar mechanism, for the gravity of the food alone would not be sufficient. Having entered the stomach, the food is there reduced into a soft paste of a grey colour, which, after being sufficiently attenuated, passes into the duodenum, or first intestine, where it undergoes new changes. Several small vessels which proceed from the gall bladder, and from a gland situated behind the bottom of the stomach, and called the pancreas, open into the duodenum, and pour into it the bile and pancreatic juice, which mingle with the food. There are also in the intestines a great number of glands, which distribute their humours through every part of the alimentary mass. It is after this mixture, that true chyle is discovered, and there is great reason to believe that it is in the duodenum that digestion is completed.

The alimentary mass continues its course through the other intestines, where it is continually moistened by the fluids which are secreted in the intestinal canal. The chyle then begins to pass into the lacteal veins which every where open into the intestines, and terminate in a vessel called the receptacle of the chyle, which is situated near that part of the back where the first lumber vertebra begins, and from it the thoracic duct rises, and ascends upwards through the chest, passing along by the side of the spine, and opens into the left subclavian vein near the internal jugular. The chyle then passes through this canal, and at length mixes with the blood, enters the heart, and having lost its white appearance, is distributed through all the arteries of the body.

But there are always some parts of our aliment that are too gross to be converted into chyle, or to enter into the lacteal vessels. These are propelled downwards by a motion peculiar to the intestines, called the peristalic or vermicular motion, by means of which they are alternately contracted and dilated. When this motion has caused the mass of food to advance as far as the third intestine, it propels the remainder through the fourth, fifth, and sixth; which last is called the rectum, and is provided with a strong, circular muscle, the sphincter, which contracts, and prevents the residuum continually passing through the rectum; thus retarded, it remains till the quantity is so considerable as to occasion irritation, and is then finally evacuated. In this operation the muscles of the abdomen, and the diaphragm, assisting the action of the rectum, the contracting power of the sphincter is overcome. From the above slight sketch of the manner in which digestion is performed, we may obtain some idea of the great wisdom which God has displayed in a function so essential and so important to our health, our comfort, and our very existence; we should be highly culpable indeed if we were inattentive to it; and if these wonders excited in our hearts no gratitude towards the author of so many blessings which we are continually enjoying.

SEPTEMBER XXI.

The Prevalence of Good in the World greater than that of Evil.

Nothing is more consoling in our trials and misfortunes, than to admit as a fixed principle, that there is more good than evil in the world. If we ask the most wretched of men, whether he can enumerate as many causes of complaint as he has motives for gratitude, he will make it appear that however great are his afflictions, they do not equal the numerous blessings he has received in the course of his life. To render this truth more evident, let us calculate how many days we have passed in the enjoyment of health, and how few in which we have suffered from illness. Let us oppose to the small number of troubles and vexations which we experience in civil and domestic life, the numerous pleasures which we enjoy Let us compare all the good and virtuous actions by which many men are useful to themselves and to their fellow-creatures, with the few actions they commit that are prejudicial to society. Let us enumerate, if we can, all the pleasures attached to every age, state, and profession; the gifts which nature abundantly bestows upon us, and which human industry uses to procure an infinite number of enjoyments and conveniencies. Let us reckon all the delight we receive upon escaping a sudden danger, upon gaining a victory over ourselves, and upon performing some act of virtue or wisdom; and let us remember that it is the prevalence of good that renders us so sensible of evil: that recent prosperity makes us forget former blessings, and that if our misfortunes make so deep and impression upon our memory, it is because they seldom happen and we are not familiar with them. In this calculation, we must only oppose to the blessings the fruition of which we recollect, those evils whose utility we do not yet know; for out of some evils great good is derived; if then we make this estimation in the moments of coolness and of serenity, and not at a time when we suffer from affliction, vexation, disappointment, or disease, we shall be sufficiently convinced, that the prevalence of good, even in this state of existence, is much greater than that of evil.

Why then do men concern themselves so little with the continual proofs they receive of God's goodness? Why do they love to dwell upon the dark side of things, and to torment themselves with unnecessary cares and anxieties? Has not Divine Providence surrounded us with pleasing objects? Why then do we for ever brood over our infirmities, our wants, and the evils which may happen to us? Why magnify them in our imagination, and obstinately turn our eyes from all that tends to cheer and tranquillize our hearts? But such is our disposition, the least misfortune that befalls us arrests all our attention, whilst a long continuance of happy days passes unnoticed. We draw upon us distress and vexation which could not have happened, if we were more attentive to the blessings of God. Let us then in future abandon a disposition like this, which only renders us miserable; let us feel a strong conviction that God has impartially distributed his blessings over the earth, and that there is no man who has just cause to complain, or who has not on the contrary the most powerful and abundant reasons to express his gratitude in songs of joy, thanksgiving, and praise.

Blessed be God who is our sovereign good? He pours joy and gladness into our hearts; if he sometimes tries his children with affliction, his consolations soon visit their desponding souls; and his goodness promises them an uninterrupted, endless felicity. He leads us through secret and unknown paths to the infinite blessings he designs for us; the very trials which he sometimes sends have a beneficent purpose to accomplish, and which we shall one day know and acknowledge; till when he spares us from suffering more than we can bear, and his all-powerful and paternal hand still protects us, and the eye of his mercy watches over us for our good and eternal preservation.

SEPTEMBER XXII.

Enmity between Animals.

THERE is a continual enmity amongst animals; they are constantly attacking and pursuing each other; every element is a field of battle for them; the eagle is the terror of the inhabitants of the air; the tiger lives upon the earth by carnage; the pike in the waters; and the mole under ground. It is the want of food which induces these, and many other species of animals, to destroy one another. But there are some creatures whose hatred of each other does not proceed from the same source. Thus those animals which entwine themselves round the elephant's trunk, and press it till they have suffocated him, do not act so with the design of procuring nourishment. When the ermine leaps upon, and lays hold of the ear of the bear and the elk, and bites them with its sharp teeth, we cannot affirm that this is done to satisfy the calls of hunger.

There is scarcely any creature, however small, which does not serve for food to some other animal. I know that many people think this arrangement of nature is cruel and unnecessary; but I can with confidence assert, that even this antipathy and enmity among animals, is a proof that every thing is wisely ordered. If we consider animals in the whole, we shall find that it is highly useful that some should subsist upon others; for on the one hand, without this arrangement, many species could not exist; and on the other, these numerous species, instead of being prejudicial, are extremely useful. Insects and many reptiles feed on carrion; others establish themselves in the bodies of certain animals, and live upon their flesh and blood; and these insects themselves serve as food, for other creatures. Carnivorous animals and birds of prey, kill and feed upon other animals. Some species multiply so abundantly, that they would become burthensome if their numbers were not diminished. If there were no sparrows to destroy insects, what would become of the flowers and fruits? Without the ichneumon, which seeks out and destroys the crocodile's eggs, this terrible animal would increase to an alarming degree. A great portion of the earth would be desert, and many creatures would not exist, if there were no carnivorous animals. It will perhaps be urged that they might live upon vegetables; but if this were the case, our fields would scarcely afford subsistence for sparrows and swallows; and the structure of carnivorous animals must have been quite different from what it now is; and if fish did not live upon the inhabitants of the water, how would they be able to subsist? Besides, if the wars amongst animals were to cease, they would lose much of their vivacity and industry, the creation would be less animated, and man himself would lose much of his activity. We may also add, that we should be deprived of many striking proofs of God's wisdom, if universal peace was to prevail amongst animals; for the address, sagacity, and wonderful instinct which they use in laying snares for, and surprising their prey, very evidently manifest the wisdom of the Creator.

So far then is the enmity which exists amongst animals from darkening the wisdom and goodness of God; that they receive additional brilliancy from what superficial observers think an imperfection. It forms part of the plan of the great system of nature, that one animal should prosecute and feed upon another. We might indeed complain of this arrangement, if it occasioned the entire destruction of any species; but this never happens, and the continual wars amongst animals, preserves a proper balance between them. Thus carnivorous animals are indispensable links in the chain of beings; and on this account their number is very small, compared with that of useful animals. We may also remark that the strongest and fiercest animals have commonly the least sense and cunning. They either mutually destroy each other, or their young ones serve as food for other beasts. Hence also, nature has granted to the weakest species so much industry and means of defence. They possess instinct, acuteness of sense, quickness, skill, and sagacity sufficient to counter-balance the strength of their enemies.

Can any one then behold this without acknowledging the infinite wisdom of the Creator; and confessing that this state of warfare, which at first seems so strange, is in fact a real good. We should be still more convinced of it, if we were better acquainted with the whole system of things, and the relations and connexions, which different creatures have with each other; but this is a degree of knowledge reserved for a future state, where the divine perfections will be manifested in infinite splendour. We may, however, in some measure even in this world comprehend why these hostilities amongst animals are necessary; but we can by no means conceive why men whose nature is so much more noble, should be continually fomenting wars and divisions so destructive to their race. To the disgrace of humanity, and the eternal reproach of the Christian religion, men pursue wars, and destroy each other, with more savage barbarity, than the wildest beasts that range the forests; than which nothing is more opposite, to the great ends for which they were created. Surely man was designed to render himself useful to his fellow-creatures, to contribute all in his power to their comfort and happiness; to be the defender of the helpless, the benefactor of the poor, and the friend of the afflicted and unfortunate. Let us not counteract these merciful designs of our blessed Lord, but endeavour to live in that peace and harmony which becomes the children of God and followers of a humble and crucified Saviour; leaving animals which are destitute of reason, to quarrel, fight, persecute, and destroy one another, whilst we live in charity with all men, doing good unto others, as we would that they should do unto us.

SEPTEMBER XXIII.

Moral Uses of Night.

At this time of the year when the days begin to grow shorter, and the nights to lengthen, many people are discontented with the change. Some wish that there was no night at all, or that, at least, throughout the year the nights were never longer than they are in the months of June and July. But such wishes are the offspring of folly and presumption; and betray the greatest ignorance; for if men reflected upon the advantages which result from the alteration of day and night, they would not thus shew their want of judgment, nor make such ill-founded complaints, but would rather bless God for the benefits they receive from the night We feel the moral utility of night in its interrupting the course of many vices. During the hours of darkness, the wicked are obliged to repose, and oppressed virtue gains some moments of relief, and cessation from misery; the unjust and fraudulent merchant ceases to cheat his neighbour, and a thousand evils are interrupted in their progress.

If there was no night, how much pleasure and instruction we should lose! The wonders of the creation manifested in the starry heavens, would be lost to us. We now every night can contemplate the grandeur of God displayed in the stars, whilst we raise our souls towards him in humble and reverent gratitude. If then every occasion which recalls God to our minds is precious, how much ought we to value the season of the night, which so powerfully declares the perfections of God.

Night is a time which is well adapted for meditation and reflection. The tumult and dissipation of the day leave but little leisure for self-examination; and afford little opportunity of detaching our affections from the earth, and of seriously occupying ourselves with considering the duties of our station, and the end for which we were created. To these salutary meditations the stillness of the night is peculiarly adapted; we may then commune with our hearts without interruption, and acquire the important science of knowing ourselves. The soul will then collect all her powers, and direct them towards those subjects which concern our eternal happiness. In those moments of peace and tranquillity, we may purify our hearts from the contagion of the world, and strengthen our minds against the temptation and alluring examples of those who float down the stream of pleasure. We may then reflect upon death, and meditate upon futurity; the calm solitude of our closets is favourable to religious thoughts, and our souls become more and more desirous of virtue. Let us then, instead of repining at the vicissitudes of light and darkness, be thankful for them, and every night before we lie down to sleep let us bless the season in which we have become better acquainted with our own nature, the glory of God, and those things which concern our salvation and eternal peace.

SEPTEMBER XXIV.

Of Man's Indifference for the Works of Nature.

Whence is it that men in general are so indifferent about the works of God in Nature? The consideration of this question may give rise to various important reflections. One great cause of this indifference, is an habitual inattention. We are so accustomed to the beauties of nature, that we neglect to admire the wisdom which stamps them all; and we are not sufficiently grateful for the numerous advantages which we derive from them. There are too many people who resemble the stupid beast which feeds upon the grass of the meadow, and quenches his thirst in the stream, without acknowledging the wisdom of him from whom these benefits proceed. Some men, even though endowed with the brightest faculties, and hence enjoying a greater share of the blessings of nature, never think of the source whence they all flow and even when the wisdom and goodness of God are most strikingly manifest, they are not affected by them because they are so frequent. Thus what ought chiefly to excite men's admiration and gratitude, renders them indifferent and insensible. Many people are also regardless of the beauties of nature through ignorance. How many are there entirely unacquainted with the most ordinary phenomena. They daily see the sun rise and set: their fields are watered with rain and dew, and sometimes with snow; every spring unfolds the most wonderful changes, but they had rather live in the profoundest ignorance, than give themselves the trouble of enquiring into the causes and effects of these phenomena. It is true that many things will always be incomprehensible to us, with whatever care we study; and the limits of our understanding are never sooner felt than when we attempt to fathom the operations of nature. We may however acquire an historical knowledge of them, and the meanest labourer may be made to comprehend how it happens, that the grain which he sows in his fields, buds and shoots up into a plant.

Other men, again, neglect the works of nature, because they are too much occupied with their own particular interests. I have little doubt that if spiders spun threads of gold; if lobsters contained pearls; and if the flowers of the fields converted the decrepitude of age into the vigour of youth; there would be many more attentive observers of nature than there now are. We are too apt to estimate things only as they affect our interest and our fancy; those objects which do not immediately satisfy our inordinate desires, are deemed unworthy of our attention; and our self-love is so unreasonable, and we so little know our real interest, that we despise what is most useful to us. Thus corn is one of the plants most indispensably necessary to our support, and yet we see whole fields waving with this useful production of nature, without paying any attention to it.

Many people disregard the works of nature out of mere indolence. They love too well their ease and repose, to curtail their sleep a few minutes whilst that they may contemplate the starry heavens; they have not resolution to quit their beds in a morning early enough to behold the rising sun; they fear it would fatigue them too much if they stooped to the ground to observe the structure of a blade of grass; and yet these very people who are so fond of their ease and convenience, are full of eagerness and activity in the gratification of their passions.

Others neglect the works of God in nature from irreligious motives; they do not desire to know the greatness of God, and have no inclination for virtue, nor the duties which it prescribes. To love and to praise God, and to be grateful for his blessings, would be to these men, duties painful and disagreeable. We have too much reason to believe that this is one of the principal causes of some men's disregard for the works of God. If they prized the knowledge of God above all other things, they would eagerly seize, and cherish with pleasure, every opportunity of strengthening that knowledge, and of perfecting their love of their heavenly Creator.

At least, two-thirds of mankind may be ranked in one or other of the classes which we have just pointed out; for there are very few people who properly study the works of God, and who love to dwell upon them. This is a truth, the mournful certainty of which is daily confirmed. Would to God that men would at length be convinced how ill it becomes them be so insensible and inattentive to the works of the Creator, and how by such a conduct they degrade themselves below the very brutes! Have we eyes, and shall we not contemplate the wonders that every where surround us! Have we ears, and shall we not hearken to the glad songs which make the heavens resound with the praises of the Creator? Do we wish to contemplate God in the world to come, and yet refuse to consider his works in which he shines so conspicuously in the garden of nature? Let us henceforth renounce this culpable indifference, and endeavour to feel a portion of that joy, which formerly penetrated the heart of David, when he reflected on the works, the glory, and the magnificence of his God.

SEPTEMBER XXV.

Of several Nocturnal Meteors.

In serene weather, when the sky is clear, we sometimes observe a circular light, or luminous ring, surrounding the moon, and which is called a halo, or crown. Its outline frequently exhibits, though faintly, the colours of the rainbow. The moon is in the centre of this ring, and the intermediate space is generally darker than the rest of the sky. When the moon is at the full, and considerably elevated above the horizon, the ring appears most luminous. It is often very large. We are not to suppose that this circle really surrounds the moon; the true cause of such an appearance must be looked for in our atmosphere, the vapours of which cause a refraction of the rays of light which penetrate them, and produce this effect.

False moons, called paraselenes, or mock moons, are sometimes seen near the real moon, and appear as large, but their light is paler. They are generally accompanied by circles, some of which have the same colours as the rainbow, whilst others are white, and others have long luminous tails. All these appearances are produced by refraction. The rays of light falling from the moon upon aqueous and sometime frozen vapours, are refracted in various ways; the coloured rays are separated, and reaching the eye, double the image of the moon. A very rare appearance is sometimes observed; we see by moon-light, after heavy rain, a lunar rainbow, which has the same colours as the solar rainbow, but much fainter; this meteor is also occasioned by the refraction of the rays of light.

When sulphurous and other vapours take fire in the superior part of the atmosphere, we often see streaks of light rapidly darting like rockets. When these vapours unite together in one mass, and becoming ignited fall down, we seem to perceive little balls of fire to fall from the sky; and as, from their distance, they appear to be about the size of stars, they are often called falling stars, and many people imagine they are real stars, which change their places or are dissipated. Sometimes these supposed stars, very brilliant, and splendidly coloured, slowly descend, acquiring new lustre, till at length they are extinguished in the lower atmosphere. Large balls of fire have sometimes been seen more resplendent than the full moon, and some of them with long luminous tails. It is very probable that these are sulphurous and nitrous vapours, which have accumulated and become ignited: they generally pass through the air with great rapidity and then burst with a loud report Sometimes, when the inflammable particles of which they are composed, are of a different nature, they disperse without noise in the higher regions of the atmosphere. The little flashes which we often may observe in the summer evenings after intense heat, are produced by the vapours of the atmosphere; and are less visible, because they are more elevated. This meteor is distinguished from real lightning by not being accompanied by thunder, or rather, these lights are the reflection of lightning at too great a distance for us to hear the thunder-clap which follows.

The flying-dragon, the dancing-goat, the burning beam, and various other meteors, owe their names to the singular appearance which they present. They are only gross and viscous exhalations which ferment in the humid regions of the lower sky, and which being pressed in several directions by the agitated atmosphere, assume different figures to which people give these extraordinary names. Experimentalists have imitated these phenomena, by the combination of certain inflammable substances.

Of all the nocturnal phenomena, none are more remarkable or brilliant, than the aurora borealis, or northern lights, which are generally seen from the beginning of autumn, till the commencement of spring, when the weather is calm and serene, and when the light of the moon is not great. The aurora borealis does not always appear the same. Commonly towards midnight, a light is perceived something resembling the first breaking of day. Sometimes also we observe streams, and sudden shoots of light, and white and luminous clouds which are in constant motion. But when the aurora borealis shews itself in full perfection, we almost always see during mild weather, towards the north, an obscure space, a thick and dark cloud, the upper part of which is surrounded by a white and luminous border. from which rays, brilliant jets, and resplendent pillars proceed, which every moment as they rise, assume red and yellow colours, then meet, unite and form thick and luminous clouds, and at length terminate in variously-coloured clouds, white, blue, fiery red, and the most beautiful purple.

How great is the magnificence of God! Even night itself proclaims his majesty. How can we complain that at this season the nights are gradually becoming longer, when they present such grand and sublime spectacles, that both interest our minds and our hearts? The phenomena which we have been describing, render the long nights of the northern nations not only supportable, but even pleasing and brilliant. Our nights, which are much shorter, might still procure us very diversified pleasures, if we would be attentive to them Let us accustom ourselves to raise our minds and our hearts towards heaven, and soar in thought beyond moons and stars unto our Creator; reflect upon his grandeur, and adore him in silence, when the sublimity of the night shall fill our souls. For thou, O Lord, art great! The solemn stillness of the night attests thy power and love. The moon, silently revolving in the azure plains of heaven, displays thy majesty. All the host of stars flaming in the firmament praise and celebrate thee; and the paler light of the aurora borealis, streaking the evening sky, manifests the perfections of our God.

SEPTEMBER XXVI.

Amphibious Animals.

BESIDES quadrupeds, birds, and fish, there is a species of animal, which can live either on the earth, or in the water, and is on this account termed amphibious. The animals of this class are all cold blooded, and have something forbidding in their look and figure; their colour is dark and disagreeable, and they have an unpleasant smell, with a hoarse voice; and many of them are venomous. Instead of bones, they have only cartilages; their skin in some instances is smooth, in others covered with scales. Most of them live concealed in dirty, swampy places; some are viviparous. These last do not hatch their own eggs; but abandon them to the warmth of the air, or water, or lay them on a dunghill. Almost all this species of animals live upon prey which they obtain either by their superior strength or cunning. They can long support famine, and in general live a very laborious life. Some of them walk, others creep, and this difference occasions them to be divided into two classes. In the first class may be enumerated those which have feet. The tortoise, which is in this class, is covered with a strong shell resembling a buckler; land tortoises are smaller than those that live in the sea, some of which are five ells long, and weigh from [illegible]ht to nine hundred pounds.

There are several species of lizards; some with smooth skins, others are covered with scales; and some have wings, and are called dragons. Amongst those that have no wings, are the crocodile; cameleon, which can live six months without food; and the salamander, which can live in the fire for some time without being consumed, because the cold and slimy fluid which it throws out from all parts, defends it from the [illegible]ects of the heat. Of all these animals the crocodile is the most formidable; it first proceeds from an egg not larger than that of a goose, and attains to the immense length of from twenty to thirty feet. It is cruel, voracious, and extremely cunning.

Serpents form the second class of amphibious animals. They have no feet; but creep along by a winding vermicular motion; by means of the scales and rings that cover their bodies; and their spinal vertebræ have peculiar structure to favour this motion. Some serpents are said to possess the property of facinating birds, and the small creatures they wish to prey upon; these, seized with a sudden fear at the sight of the serpent, and perhaps stupified by the poisonous and fœtid exhalations it emits, have no power to fly, and fall an easy prey into the gaping throat of their adversary. The jaws of serpents can be opened to such an extent that they are able to swallow animals of a larger bulk than their own heads. Some serpents have fangs in their mouths resembling their other teeth, and they act as a sort of dart which they can push in and out as they please; and by this means they insert into the wound which they make, a poisonous humour, which is ejected from a little bag placed at the root of the tooth. This poison has the peculiar property of only being hurtful to parts where the flesh has been wounded, for it may be taken internally without danger. The serpents thus armed, form but about the tenth part of the whole species; none of the others are venomous, though they dart at men and animals with as much fury as if they could hurt them. The rattle-snake is by far the most dangerous. It is commonly from three to four feet long, and about as thick as the thigh of a man. Its smell is strong and disagreeable; and it seems as if nature had designed this, as well as its rattles, to warn men of its approach that they might have time to avoid it. This reptile is most furious when tormented by hunger, or when it rains. It never bites till it has coiled itself in a circle; but it assumes this form with incredible quickness: to coil itself up, to rear itself upon its tail, to dart upon its prey, to wound it and to retire, is but the work of a moment.

Perhaps it will be asked, why God has created a species of animal that only seems to exist for the torment and destruction of man? This and similar questions shew that we only think of ourselves, that we are too hasty in forming our judgments, and too much disposed to blame the works of God. Considered in this point of view, such questions are very reprehensible; but if we ask them for the purpose of being more convinced of the wisdom and goodness of God in the works of the creation, they are not only commendable, but absolutely necessary for every reflecting person to ask. To those then who enquire for the sake of information, and further advancement in the things of God, I wish to address myself. Perhaps it may appear to you, that such creatures as lizards, and serpents, could not have been created for the general good of the world. But this is a rash opinion; for if amongst amphibious animals there are some which do too much mischief, it is certain that the greater part of them are harmless. And is it not a proof of God's goodness, that not more than the tenth part of serpents are venomous? And even those which are mischievous, have their bodies so formed, that it is generally possible to escape their attacks. Thus, however formidable is the rattlesnake, it cannot conceal its approach; its odour and rattles giving sufficient warning. It is also worthy of remark, that Providence has opposed to this dangerous animal an enemy able to conquer it. The sea-hog every where seeks and devours it with avidity: and a child is strong enough to kill the most terrible of these reptiles, for a very slight blow with a stick across their backs, almost instantly kills them. Besides, it would be extremely unjust only to dwell upon the mischief these creatures may do us, without considering the advantages which they actually procure us. Some of them are beneficial as nourishment; others supply us with medicines; and the shell of the tortoise is useful for many purposes. In short, the wisdom and goodness of God are not less conspicuous in this, than in all other parts of the creation. To reflect upon his divine perfections, to admire and to adore them, is our duty when we see animals which appear to be injurious to us; but never let us complain of his arrangements, or murmur at his dispensations; it would be still more culpable with regard to these creatures, because our faculties are too limited to comprehend the various uses for which they may be designed.

SEPTEMBER XXVII.

Perfections of the Works of God.

WHAT can equal the perfections of the works of God; and who can describe the infinite power which is displayed in them? It is not only that their immensity, number, and variety fill us with admiration; but each work in particular is formed with such infinite art, that each is perfect in its kind, and the wonderful proportion and regularity of the smallest productions, display the boundless intelligence and grandeur of their Author. We are justly astonished at the different arts which the moderns have invented, and by means of which they execute things that would have appeared to our ancestors as supernatural. We measure the height, the breath, and the depth of bodies; we know the orbits of the stars; and we can direct the course of rivers; we can elevate or depress waters; construct buildings to move upon the sea, and perform many other works which do honour to the human understanding. But what are all the inventions of man, his most magnificent and beautiful productions, in comparison of the least of the works of God? How weak and imperfect imitations, how far below the original! Let the most eminent artist exert all his skill to give his work a pleasing and useful form; let him polish and perfect it with all his art and care, and after all his labour, industry, and efforts, let him examine his performance through the microscope, and see how coarse, ill-shaped, and rough, it will appear! He will discover how great is its want of regularity and proportion! But whether we examine the works of the eternal God through a microscope, or with the naked eye, they bear the minutest examination, and the closest inspection; they are always admirable, always beautiful, of an exquisite form and order, of an incomparable symmetry.

Divine wisdom has formed and arranged all the parts of every body with infinite art, and wonderful harmony and proportion. Such is the prerogative of unlimited power, that admirable order reigns throughout the creation; from the greatest to the most minute productions of nature, all is harmony; every thing is so well connected, that no void is perceptible, and in the vast catenation of created beings, not a single link is wanting; nothing is out of place or defective, every thing is necessary to the perfection of the whole, and each part, separately considered, will be found perfect in itself. It is impossible to describe the numberless beauties, the ever varying charms, the beautifully blended shades of colouring, the rich hues, and diversified ornaments of the meadows and the valleys, of the mountains and the forests; of the plants and the flowers! Is there a single work of God which has not its peculiar characteristic beauty? Is not this which is the most useful, at the same time the most pleasing? What an astonishing variety of forms, figures, and dimensions, do we not discover in the inanimate part of the creation? But a still greater diversity is observable amongst animated beings, and yet each individual is perfect in its kind, without any thing to add or diminish. How powerful and infinite then must be that being, by a single act of whose will so many creatures rose into existence.

But to admire the grandeur and power of God, we need not go back to that remote period of time, when, at his word, every being arose out of nothing, every thing was created in an instant, and in a moment attained its full perfection. Do we not now behold at the return of each succeeding spring a new creation? What can be more admirable and striking, than the revolution which then takes place! At the close of autumn, the valleys, the fields, the meadows, and the forests gradually droop, and appear to die; nature during the winter, loses all her beauties; the very animals languish, the little birds hide themselves, and no longer pour their swelling notes through the groves, where not a green leaf is seen, but all is desert, and nature mourns her faded charms. Yet at this very time a secret power is working for her renovation without our being conscious of its influence; life again animates the torpid bodies, and they are preparing to undergo a kind of resurrection.

How can we so often witness this magnificent spectacle, without admiring, in humble adoration, the power and glory of the eternal God, who has given to the trees their foliage, to the flowers their beauty and fragrance; to the woods, and to the meadows, their delightful verdure; and who has caused bread, wine, and oil to spring up from the earth, to make glad the heart of man? O Lord, how great and manifold are thy works! thou hast made them all with wisdom: the earth is full of thy riches; I will never recline beneath the shade of a spreading tree, and view the fields gay with flowers, the corn waving in rich luxuriance; or see the distant forests, without joyfully remembering that it is my God and heavenly protector who has thus clothed the creation in beauty.

SEPTEMBER XXVIII.

Fruits.

THIS is the blessed season in which the Divine goodness lavishes upon us fruits of every kind in plentiful abundance. "The charms of summer are succeeded by solid enjoyments; delicious fruits replace the faded flowers. The mellow apple, whose golden brilliancy is heightened by the rich streaks of purple, weighs down the branch which bears it; the luscious pears, and plums, whose juice is sweeter than honey, display their beauties, and invite us to pluck them." How inexcusable and selfish are those people, who at the sight of all these blessings, which the munificence of God bestows upon them, never have any good thoughts arise in their souls, nor endeavour to sanctify the pleasures of autumn by reflecting on the kindness of their God!

How wisely has the Creator distributed fruits in the different seasons of the year! Though summer and autumn are generally the times when nature produces these rich gifts; when the assistance of art we can obtain them both in spring, and in winter, and our tables may thus be provided with fruit all the year round. As early as the month of June, nature produces of herself, unaided by art, raspberries, gooseberries, and cherries. The month of July furnishes our tables with peaches, apricots, and some kinds of pears. In August fruits appear in the most lavish profusion; figs, late cherries, and a variety of delicious pears. September gives us grapes, winter pairs, and apples; and October yields more varieties of the same kinds of fruits.

Thus nature distributes her gifts with the wisest œconomy, so that without having them in too great abundance, we enjoy an ample variety, and constant succession. And though, as winter approaches, the number and variety of fruits begin to diminish, we are still able to preserve many of them for use during the whole of this season. Providence has not designed man to be idle, but has intended him to be always active, and to labour and supply his wants; hence he has distributed his blessings with such diversity, and has so formed them, that if proper care is not taken to preserve them, they will spoil, and be of no value.

How great is the abundance of fruits, and the profusion with which they are distributed! Though birds and insects are continually feeding upon them, we have yet a sufficient quantity left for use. If we could calculate how much fruit a hundred trees would produce in a favourable year, we should be astonished at the immense quantity. Why is there such abundance of fruits, if not to supply men with nourishment, and particularly those who are poor and destitute. In giving to them these fruits so plentifully, Providence has supplied them with a cheap, nourishing, and wholesome food, and so agreeable that they have no cause to envy the rich their seasoned and often unwholesome viands.

Few kinds of aliment are more salubrious and nourishing than fruits; and we ought to consider it as a merciful care of God, that he has given them to us in a season, when they may be used as most excellent remedies, as well as refreshing and pleasant food

Nothing is more delicious than fruit, each species has a taste peculiar to itself, and it is certain they would lose much of their value, if they had all the same flavour; their variety renders them more exquisite; and delectable. Thus Providence, like a tender parent, not only provides for the support of his creatures, he also ministers to their pleasures. May it be our fondest delight, and most pleasing duty, to devote ourselves to the service of so kind a father. How great will our happiness be, if we give ourselves up to him with full purpose of heart! What sweet consolation, and pure and exalted pleasures shall we then taste! What bright hopes may we not indulge for happiness in our future existence.

SEPTEMBER XXIX.

Hymn of Praise, imitated from the 147th Psalm.

PRAISE ye the Lord, for he is Omnipotent! He telleth the number of the stars, and calleth each by its name. Thou earth and ye heavens celebrate him; his name is great and glorious; the sceptre of his power rules over you with majesty; celebrate the Almighty!

Unite your voices to bless the God of Mercy! Ye who are distressed, come unto him; come to your Father; he is gentle, merciful, and gracious; a God of peace, charity, and love.

The heavens become dark; but it is to water the earth with fruitful rains. Verdure beautifies our fields; grass grows, and fruits ripen; for the clouds pour from heaven the bounty of our God, who is full of kindness. Let every thing that breathes glorify the Lord! Beasts and birds, fish and insects, nothing is forgotten, all the objects of his care, all are nourished by his bounty. Let us praise and celebrate our heavenly Father!

O how he supports and comforts those, who trust in his mercy, and confide in his power! One friend often cannot save another, and the utmost strength of man cannot save him from danger. Alas! wretched is the mortal who seeketh vain supports! Put not your trust in princes, nor in the sons of men, in whom there is no help; but repose on the Rock of Ages, your Saviour, and your God. His word is a source of life and salvation. O ye who are of his covenant, how great is your happiness! Praise, exalt, and celebrate the God of truth, and mercy!

SEPTEMBER XXX

Invitation to praise God.

GREAT is the Lord; innumerable heavens are his pavilion; the thunder-cloud is his chariot, and the lightning walketh by his side.

The lustre of the morning is but the reflection of the hem of his garment: when his splendour goes forth, the light of the sun is eclipsed.

Praise the eternal God, ye luminaries of his palace: ye solar rays, flame his glory: Thou earth, lift up thy voice and sing his praise. Celebrate him thou sea, foam ye billows to his honour, ye rivers praise him in your course! Roar ye lions of the forests to his glory! Sing unto him, ye feathered inhabitants of the air! Resound his praises, ye echoes! Let all nature in harmonious concert chaunt his honour! And thou, O man, lord of this lower world, mingle thy thanksgivings with the universal song! God has done more for thy happiness than for all the rest: He has given thee an immortal spirit, which enables thee to comprehend the structure of the universe, and to become acquainted with the springs of nature.

Praise him when the sun rises from his ruddy bed, and paints the east with glory, praise him when his departing beams faintly irradiate the western horizon; with the voice of universal nature, unite thy accents, tuned to his praise. Praise him in the rainy and in the dry seasons; in the tempest and in the calm; when the snow falls, when the ice stops rivers in their course, and when verdure covers the face of the earth. Exalt him for thy own salvation; when thou soarest up to him, all low desires and base inclinations shall leave thy heart; and thou shalt retire with greater elevation of thought and purity of soul.

OCTOBER 1

A Hymn in praise of God.

All the hosts of heaven glorify the power and majesty of the Creator; and all the spheres which roll in the immensity of space, celebrate the wisdom of his works. The sea, the mountains, the forests, and the deeps, all created by a single act of his will, are the heralds of his love, and the messengers of his power.

Shall I alone be silent, and not chaunt hymns to his praise? My soul longs to soar up to his throne; and though my language may be feeble, my tears will express the love which I feel for my heavenly Father and Protector. Though my tongue falter, and my broken accents declare my weakness; the most high God sees through my heart, and gladly receives the pure incense which ever burns there on his holy altar. But how shall I praise thee, who art far above all praise? Could I take the sun-beams for my pencil, I could not sketch a single ray of thy essence. The purest spirits can offer thee but imperfect praise. By what power do millions of suns shine with so much splendour?

STURM'S REFLECTIONS.

“and trace the course of the limpid stream
in which the trees are reflected.” Vol. I.

Who has marked out the wonderful course of those revolving spheres? What chain unites them, and what power influences them? It is the breath, the word of Jehovah our God.

The Lord called the worlds, and they moved in their spheres through the space of heaven. Then was our world produced; the birds, the fish, the cattle; and the wild beasts that sport in the forests: and to complete all, came man to inhabit the earth, and receive joy in its productions. Our sight is delighted with smiling and varied prospects: our eyes wander over the green plants, or contemplate forests that seem to rise into the clouds; they view the sparkling dew drops of morning, that water the flowers; or they pursue the windings of the limpid stream which reflects the trees.

To break the force of the winds, and to offer us the most lovely views of nature, the mountains rear their lofty summits, and from them flow the purest streams. The dry valleys, and parched fields, are watered by rain and dew, and the air is cooled with the gentle breeze.

It is God who directs the spring to unfold a green carpet under our feet; it is he who gilds the ears of corn, and tinges the grapes with their purple hue; and when cold descends to benumb nature, he wraps her in a pure mantle. Through him, the human mind penetrates the abode of the stars; recalls the past, anticipates the future, and discerns the evidence of truth, from the delusion of error; and by his power we conquer death, and escape from the tomb. Unto the mighty God of the universe then be ascribed all honour, glory, and renown, for ever and ever.

OCTOBER II.

Effects of Fire.

NOTHING in nature can exceed the violent effects of fire, and the extreme rapidity with which ignited particles [illegible] motion is altogether astonishing. But how few people attend to these effects, or deem them worthy of their observation! Yet in our domestic affairs we daily experience the beneficial influence of fire; and perhaps on this very account we are less attentive. I wish, then, in the present reflection, to make my readers call to mind this great blessing of Providence, and, if possible, cause them to feel its full value.

One effect of fire, and which must be familiar to every person, is that of dilating such bodies as are exposed to its influence. A piece of iron, made to fit a hole in a plate of metal, so that it easily passes through when cold, being heated, cannot be made to enter; but upon being again cooled, readily passes into the hole as at first. This dilatation caused by the heat, is still more perceptible in fluid bodies: as spirits, water, and more particularly air; and upon this principle our thermometers are constructed.

If we observe the effects of fire upon compact and inanimate substances, we shall find that they soon begin to melt; and are changed partly into a fluid, and partly into a solid of a different nature. It communicates fluidity to ice, oil, and all fat substances, and most of the metals. These bodies are rendered susceptible of such changes, from their combination being more simple, and their particles more homogeneal, than those of other bodies. The fire consequently penetrates their pores more readily, and succeeds sooner in separating the parts from each other; hence some of these matters evaporate when the fire penetrates them in too great a quantity, or with too much force. Some solid bodies undergo other changes; sand, flint, slate, quartz, and spar, become vitrified in the fire; clay is covered into stone; marble, calcareous stones, and chalk, are changed into lime. The diversity of these effects does not proceed from the fire, but from the difference in the kind of the bodies upon which it acts. It may produce three kinds of effects upon the same body; it may melt, vitrify, and reduce it into lime, provided that the matter possesses the three necessary properties, of being metallic, vitrifiable, and calcareous. Thus fire of itself produces nothing new; it only developes in bodies those principles, which before its action were not perceptible.

Upon fluids, fire produces two effects, it makes them boil, and converts them into vapour. These vapours are formed of the most subtle particles of the fluid separated by the fire; and they ascend in the air because they are specifically lighter than that of fluid. In living creatures fire produces the sensation of heat in every part of the body; without this element man could not preserve life; a certain degree of heat is necessary to give vitality and motion to the blood; for which purpose we are constantly inhaling fresh air, which always contains the matter of heat, and imparts it to the blood in the lungs, whilst this organ of respiration expels the air, that has lost its vivifying properties.

The above reflections ought to confirm in our minds the important truth, that Providence has constantly in view the welfare of man, and is ever giving us proofs of his divine love. How numerous are the advantages which the effects of fire alone procure us! By the intimate union of fire and air, the seasons are renewed, the moisture of the soil, and the health and life of man supported; by the action of fire, water is put in motion; organized bodies are brought to a state of perfection; the branch is preserved in the bud; the plant in the seed; and the embryo in the egg; it serves to prepare our food; contributes to the formation of metals, and renders them fit for use.

In short, when I recollect the different properties of the [illegible] convinced of the numerous blessings which the Creator has by its means diffused over the globe; a truth which ought to call forth our love and gratitude for the Author of our being, and fill our minds with contentment and a perfect reliance upon God.

OCTOBER III.

The Instinct and Industry of Birds.

Birds afford us many innocent pleasures, and now that some of them are but to disappear for a considerable space of time, let us bestow a little attention upon them, that their presence may rejoice us, and make us think with gratitude and pleasure upon God who is their Creator as well as ours. It is very pleasing to observe the different instincts which he has given to them None of these instincts are useless or superfluous, each is indespensably necessary to the preservation and well being of the bird, and however little we know of them, it is sufficient to give the highest ideas of the wisdom and goodness of God.

When we reflect upon that particular instinct which incites birds to move, we may find in that alone just cause of admiration. Experience convinces us that corporeal motion requires something more than mere strength, and limbs supple and well formed. It is not till after many essays and falls that we can preserve our balance, walk with ease, run, leap, sit down, and rise up again: and yet to a body constructed as is ours, these motions seem to be much easier than they are to birds. These animals also have only two feet, but their bodies do not rest perpendicularly upon them; they project before as well as behind, and yet a chicken will stand upright, and run about almost as soon as it leaves the egg. Young ducks which have been hatched by a hen, know their own element, and swim in the water without having been directed by example or instruction. Other birds know how to rise from their nests into the air, balance themselves, and pursue their course through the air, making equal strokes with their wings; stretch their feet, spread out their tails, using them as oars, and perform long voyages to countries very remote from the place of their nativity.

How admirable also is the art which they use to obtain a subsistence; an art which they bring into the world with them! Certain birds, though not aquatic, live upon fish; consequently they ought to find it more difficult to seize their prey than is the case with water-fowl. Who teaches them this instinct? They stand on the brink of the water, and when they perceive at a distance a shoal of fish advancing, they pursue them, skim along the surface, and suddenly plunging in the water, seize upon a fish. Who has given to birds of prey, their piercing eye, courage, and weapons, without which they could not obtain the means of subsistence? Who teaches the stork where to find frogs and insects to feed upon? To procure them she must carefully traverse the meadows, and seek them in the furrows of the field; and she must prolong her search till morning, when other birds begin to awake. What incredible strength the condor must possess, since it is said to carry off a deer, and prey upon an ox! How can we reconcile with the savage nature of the quail, that maternal instinct which makes her adopt young birds of any species, and not only take them under her protection, but lavish upon them her most tender cares! What cunning the crow uses, to hide the prey which she cannot devour at once! She carefully conceales it in places that other crows are not liable to frequent; and when hunger again presses her, she well knows the magazine where she [illegible] her treasure.

We might make many more observations of this kind, without being at all able to explain all the mysteries in the instinct of birds. But the little that we know of them is sufficient to dispose those, whose minds are open to contemplate the works of nature, to follow still more noble pursuits. Let us not confine ourselves to the consideration of the instincts and properties of birds, which ought only to be regarded as a first step leading to more sublime meditations; but let the admiration which these raise in us, elevate our souls to the God from whom these animals have received all their faculties, and who has prepared and combined so many things for the continuance and multiplication of this part of his creatures.

OCTOBER IV.

Animal Reproductions.

Here we discover a new field of wonders which seem wholly to contradict the principles which we had adopted concerning the formation of organized bodies. It was long supposed that animals could only be multiplied by eggs, or by young ones. But it is now found that there are some exceptions to this general rule, since certain animal bodies have been discovered, which may be divided into as many complete bodies as we please; for each part thus separated from the parent body, soon repairs what is deficient, and becomes a complete animal. It is now no longer doubtful that the polypus belongs to the class of animals, though it much resembles plants, both in form, and in its mode of propagating. The bodies of these creatures may be either cut across, or longitudinally, and the pieces will become so many complete polypi. Even from the [illegible], or least part cut off from the body, one or more polypi will be produced; and if several pieces cut off be joined together by the extremities they will perfectly unite, nourish each other, and become one body.

This discovery has given rise to other experiments, and it has been found that polypi are not the only animals which live and grow after being cut in pieces. The earth-worm will multiply after being cut in two; to the tail part there grows a head, and the two pieces then become two worms. After having been divided, they cannot be joined together again; they remain for some time in the same state, or grow rather smaller; we then see at the extremity which was cut, a little white button begin to appear, which increases and gradually lengthens. Soon after we may observe rings at first very close together, but insensibly extend on all sides; a new stomach, and other organs are then formed.

We may at any time make the following experiment with snails: Cut off their heads close by their horns, and in a certain space of time the head will be reproduced. A similar circumstance takes place in crabs; if one of their claws is torn off, it will again be entirely reproduced.

A very wonderful experiment was made by Duhamel on the thigh of a chicken. After the thigh bone, which had been broken, was perfectly restored, and a callous completely formed, he cut off all the flesh down to the bone; the parts were gradually reproduced, and the circulation of the blood again renewed. We must acknowledge then that some animals may be multiplied by being divided into pieces; and we no longer doubt that the young of certain insects may be produced in the same manner as a branch is from a tree; that they may be [illegible] in pieces, and live again in the smallest pieces; that they may be turned inside out like a [illegible] [illegible] to pieces, then turned again, and yet live, eat, grow, and multiply. Here a question offers itself which perhaps no naturalist can resolve in a satisfactory manner. How [illegible] happen that the parts which are thus cut off, can be again reproduced? We must suppose that germs are distributed to every part of the body; whilst in other animals they are only contained in certain parts. These germs unfold themselves when they receive proper nourishment. Thus, when an animal is cut in pieces, the germ is supplied with the necessary juices, which would have been conveyed to other parts if they had not been diverted into a different channel. The superfluous juices develope those parts which without them would have continued attached to each other. Every part of the polypus and worm contains in itself, as the bud does, the rudiments of a tree, all the viscera necessary to the animal. The parts essential to life are destributed throughout the body, and the circulation is carried on even in the smallest particles. As we do not understand all the means which the Author of nature makes use of to distribute life and feeling to such a number of animals, we have no reason to maintain, that the creatures of which we have been speaking, are the only ones which form exceptions to the general rule, in their mode of propagating. The fecunity of nature, and the infinite wisdom of the Creator, always surpass our feeble conceptions. The same hand which has formed the polypus and the worm, has also shown us that it is able to simplify the structure of animals.

OCTOBER V.

The Organs of Taste.

We should possess fewer sources of pleasure if we had not the faculty of distinguishing [illegible] taste different kinds of food. The great variety of fruits which abound in this season, may naturally induce us to reflect upon this subject. Our pleasures would be considerably diminished, if the apple, the pear, the plum, and the grape, all had the same flavour. The faculty of distinguishing them, or the sense of taste, is a gift of God's goodness, and a proof of his wisdom, which deserve our utmost gratitude.

What are the means which enable us to taste and distinguish our food? The tongue is the principal organ; for this purpose its surface is furnished with nervous papillæ, by means of which we receive the impression of taste. This structure is evident upon dissecting the tongue; for having taken off the membrane which covers it, numerous roots where the nerves terminate appear; and it is precisely where these nervous papillæ are found that we have the sensation of taste, when they are wanting, we have no sense of tasting. When we put highly flavoured things under the tongue, we have scarcely any perception of them, till they are attenuated, and brought to the surface of the tongue, when we immediately become sensible of their flavour, consequently the sensation of taste is only powerful where the nervous papillæ are in the greatest quantity, and that is in the part nearest the throat.

To be still more convinced that the sense of taste depends upon the nerves, we have only to examine the tongue of a dog, or of a cat. In these animals the nervous papillæ are situated towards the roof of the tongue; the fore part being destitute, whilst the palate is covered with them; hence, with these animals, the tip of the tongue is not susceptible of taste.

How skilful this organ of taste is constructed, all the parts of which no anatomist has yet been able to discover! Is it not the effect of infinite wisdom, that the tongue receives a greater number of nervous fibrillæ than any other part of the body, and that it is filled with little pores, that the salt and savoury parts of food may penetrate more deeply, and in greater abundance, to the nervous papillæ? Is it not owing to the same wisdom, that the nerves whose fibres spread over the palate and throat, are also extended to the nose, and eyes, as if to make these organs contribute their share in discerning our aliment? Another thing worthy of admiration, is the duration of the organs of taste; however fine and delicate in their structure, they continue longer than instruments of stone and steel. Our clothes wear, our flesh decays, our bones become dry, whilst the sense of taste survives them all.

Seeing then, that God has favoured us with faculties superior to all other creatures, let us endeavour always to exert them for the best purposes. If we are unwilling to acknowledge the wisdom and goodness of our Creator, who else is to render him that homage? Let us reflect on the abundance we receive from the animal, vegetable, and mineral kingdom. The heavens and the earth, the air, and the ocean, contribute to our happiness; wherever we go, we behold the gifts of God. From the lofty summits of the mountains, the depths of the vallies, the beds of lakes, and the bosom of rivers, we derive sustenance and pleasure. Though it is reasonable that we should esteem and highly value this choice gift of God, yet let us not prize it beyond the design of the Divine Giver. The sense of taste is bestowed on us as a means to conduct us to the noblest ends. How absurd and culpable it would be, if we made our chief happiness to consist in those pleasures of which this sense is the organ: and to live only to gratify the palate by savoury viands and delicious drinks. Let us shrink from the idea of reducing ourselves to the level of the brute, whose chief delight is in eating and drinking. Let us ever remember that we have an immortal soul, which can never be satisfied with any thing short of the Supreme Good; and to have a true relish for this good, to be desirous of being nourished by it, constitutes the wisdom and felicity of the man and the Christian.

OCTOBER VI.

Of God's Government with regard to Natural Events.

ALL the events which take place in the heavens, upon the earth, and in the air, are regulated according to prescribed natural laws. But it would be wrong not to acknowledge the influence of a particular Providence, which directs natural things according to its own views, and makes them concur in its designs. God makes use of natural causes to chastise or to recompense men; and it is thus for example, that at his command the air is pure or corrupt, and the seasons are fruitful or unproductive. He prevents or assists the designs of men: sometimes by winds and storms, at others by the flux and reflux of the sea. It is true that God does not in general interrupt the course of nature; but it is equally certain that nature cannot act without his will and concurrence. The parts which constitute the visible world cannot use their power as they please; and God can influence his creatures without overturning the order of nature. Fire, water, wind, and rain, have their natural causes and peculiar properties; and God uses them to execute his designs in a manner suitable to their nature. He uses the heat of the sun to warm and fertilize the earth; he employs the winds and the rain to purify and cool the air, but always in such a way as best suits his views and purposes.

A great part of the good and evil which we experience in this state of existence, proceeds from surrounding objects, and as God interests himself in every thing which happens to man, he undoubtedly has an influence upon those objects, and upon every part of nature; and on this are founded the rewards which he promises to virtue, and the chastisements with which he punishes vice. The one he crowns with peace and prosperity; and when he pleases, sends war, famine, and pestilence to punish the other. In short, all natural causes are in the hand of God, and immediately under his guidance. Man himself is a proof of this. How frequently his industry subdues nature! Though he cannot change the essence of things, he is able to make use of natural causes, so that effects result from them which would not have taken place without the art and direction of man. But if Providence has in some degree subjected natural things to human industry, how much more rational is it to suppose he reserves to himself the supreme government and direction of all these things!

From all this we may conclude, that a particular Providence is necessary to watch over the government of the world. Natural causes are doubtless excellent instruments; but to be useful they should be under the direction of a wise governor. It would be unreasonable to desire that God should every instant change the laws of nature which he has once established; that if, for instance, a man fell into water, or in the fire, he should neither be drowned in the one case, nor burnt in the other. Thus, again, it is not to be expected, that Providence will preserve men who shorten their lives by intemperance; or that he will work miracles to save them from the misfortunes which they bring upon themselves, by their own misconduct and folly. But it is our duty to attribute to the guardian cares of Providence all those beneficial dispensations, which minister to our wants, and fill our hearts with joy. All the disorders of nature are also the effects of the power of God, and may be regarded as the means which he uses to punish men. It is under this belief that on the one hand is founded the efficacy of those prayers by which we implore the blessings of heaven, peace, and fruitful seasons; and on the other offer up our thanksgivings, for the mercies which we have so abundantly received.

OCTOBER VII.

The Inexhaustible Riches of Nature.

Nature is so liberal to us, so abundant in resources to supply all our wants, so rich in gifts, that they surpass in number the drops of water in the ocean.

How many different things does one single individual require during a life of sixty years! How much he wants for food and raiment, for the sweets and conveniences of life, for the pleasures, the amusements, and the duties of society; not to mention extraordinary cases, and unforeseen accidents. Every age, state, and condition of life, in every country, and amongst every people, from the king to the beggar, from the suckling babe to the old man, has its particular wants and necessities; what agrees with one does not suit another; and all require provisions, and different means of subsistance. Yet we see nature suffices for all, and provides so liberally for every want, that each individual receives all that is necessary to him. Since the first age of the world, the earth has not ceased to open her bosom, the mines are not exhausted; the sea constantly provides subsistence for a great number of creatures; plants and trees have always buds and seed, which germinate and are fruitful in the proper season. All-bountiful nature diversifies her riches that they may not be too much exhausted in one place; and when any species of plants, fruits, or provisions, begin to diminish, she produces others, and she does it so that the desire or taste of men should lead them where her productions are most abundant.

Nature is a wise economist, who takes care that nothing shall be lost. She derives profit from every thing. Insects serve as food to greater animals; and these are always useful to man in one way or another. If they do not supply him with food, they provide him with raiment; or they furnish him with arms, and weapons of defence; and if they answer none of these purposes they at least procure him excellent medicines. If disease sweeps off some species of animals, nature repairs that loss by the increase of others. She even makes use of the dust, of dead bodies, and putrid and corrupt substances for the nourishment of some creatures, or as manure to the earth.

How rich also is nature in fine and delightful prospects! Her most beautiful dress only requires light and colours; and with these she is abundantly provided; the scene which she presents is continually varying, according to the point of view in which it is seen. And while in one place the eye is gratified with the most beautiful forms; in another the ear is charmed by melodious sounds, and the organ of smell is refreshed by the most agreeable perfumes. In short, the gifts of nature are so plentiful, that those which are continually used never fail. She distributes her riches throughout the earth, and diversifies them in different countries, taking from some, and giving to others;

by means of commerce such relations and links are established between distant kingdoms, that her productions passing through an infinite number of hands, are much increased in value by their extensive and continual circulation. Such, in the hands of God, are the inexhaustible riches of nature, for which we can never be too grateful.

OCTOBER VIII.

Petrifactions.

The transformation of different substances from the animal or vegetable into the mineral kingdom, is a peculiarity in natural history well deserving of our attention. Petrifactions throw much light on the natural history of the earth.

The first thing worthy of remark in petrifactions is their external form; which clearly shews that they have once belonged to the vegetable or the animal kingdom. The petrifaction of animals is not unfrequent. Aquatic animals are found petrified; and it is not uncommon to meet with entire fishes in this state, the least scales of which are distinctly visible; and the multitude of shells and worms found in the bowels of the earth apparently converted into stone, is very great; and there are besides many petrifactions of animals found, no similar species of which are at present known to exist. The petrifactions of marine substance are found in great abundance in various parts of the earth; on the summits of the loftiest mountains, at an elevation of several thousand feet above the surface of the sea; and others at a great depth in the earth. Various species of petrified plants are also met with in different strata of the earth; and often the impressions which they have made are only seen, the substances themselves being destroyed. In some places whole trees are found buried more or less deep in the earth, and converted into a stony substance; but such petrifactions do not appear to be of a very ancient date.

It may with propriety be asked how these petrified substances got into the earth, and particularly how they could be found on the highest mountains? And how animals, which generally live in the sea, and do not belong to our climate, have been transported so far from their natural abode? To explain this phenomenon many causes may be assigned. These petrifactions may be regarded as a certain proof that water once covered the greatest part of the earth; and as, wherever we dig, whether on the tops of the mountains, or in the deepest mines in the earth, we find all kinds of marine productions, it would seem as if no more satisfactory explanation could be given. The great quantity of petrified shell-fish found often in very high situations, and forming regular strata, gives us reason to believe that these heights once made a part of the bottom of the sea; and it is the more probable because we know the bed of the ocean resembles the solid earth. We are yet very imperfectly acquainted with the manner in which nature effects these petrifactions. It is certain that bodies will not petrify in the open air, because animal and vegetable substances are dissolved or become putrid in that element; so that air must be wholly or partially excluded from the places where the process of petrifaction is going on. A dry soil has n[illegible]fying property. Running waters may encrust s[illegible]odies, but cannot change them into stone; the very stream of the water would prevent it. A soft moist earth containing calcareous matter in a state of solution, most probably contributes to petrifaction; the fluid penetrates into the pores of vegetable and animal substances, and as they dissolve, deposits calcareous matter, which unites with and adapts itself to the substance in question. From the above account we may deduce some consequences which throw considerable light upon the subject. All animals and vegetables are not equally proper to be converted into stone; for that purpose they should possess a certain hardness of texture, which would prevent their becoming putrid, before they became petrified. Petrifactions are chiefly formed in the interior of the earth; and the place where they are formed should be neither very wet nor very dry. All the kinds of stones which contain petrifactions, or form the substance of them, are the work of time, and are still daily producing. Such are the calcareous and argillaceous earths, and several others of a similar nature; and petrified bodies partake of the nature of these stones.

Though petrifactions were of no other use than to throw some light upon the natural history of our globe, they would on that account alone highly merit our attention. But if we consider them as proofs of the secret operations and changes of nature, they will be very useful by manifesting the wonderful power and wisdom of God.

OCTOBER IX.

The Operations of Nature are gradual.

We may observe an admirable gradation, an insensible progress from the simplest to the most complex perfection throughout nature; and there is no intermediate space which has not some characteristic of what precedes and of what follows; there is neither a void nor a break in the whole of nature.

Earthy particles form the chief composition of solid bodies, and are found in all substances decomposed by human art. From the union of earth with salts, oils, and sulphurs, &c. result different combinations of earths more or less compound, light, or compact. These insensibly lead us to the mineral kingdom. The different species of stones are very numerous, and their figure, colour, size, and hardness, are very different. We find amongst them various metallic and saline matters, from which minerals and precious stones are produced. In the class of stones, some are fibrous, and have laminæ, or a sort of leaves, as slate, talc, litophytes, or stony marine plants; and the amianthus, or stony flower of mines; and these lead us from the mineral to the vegetable kingdom. The plant which seems to be the lowest in the scale of vegetation, is the truffle; and next to it are the numerous species of mushrooms and mosses. All these plants are imperfect, and properly only constitute the limits of the vegetable kingdom. The most perfect plants naturally divide themselves into three great families, which are distributed over all the earth; these are herbs, trees, and shrubs.

The polypus seems to partake both of the vegetable and animal kingdom, and forms the connecting link between plants and animals.

Worms commence the animal kingdom, and lead us to insects; those which are inclosed in a stony or scaly shell, seem to unite insects to shell-fish. Between these, or rather next to them, is the class of reptiles; which, by means of the water-snake, are united to fish. The flying-fish leads us to birds. The ostrich, whose feet nearly resemble those of a goat, and which runs rather than flies, seems to link birds with quadrupeds. The ape appears to be between man and quadrupeds. There are gradations in human nature as in all other things; between the most perfect m[illegible]d the ape, the number of links is very great. [illegible]ow many must there be between the most perfect man, and the lowest angel! How many between the archangels and the Creator of all things! Here, new links, new designs, new beauties, and excellencies, are perceptible; but in the spiritual world, these gradations are concealed by an impenetrable veil. However, we have the consolation of understanding from Revelation, that the immense space between God and the Cherubim, is filled by Christ, who is God manifested in the flesh. By him human nature is glorified and exalted; by him man is elevated to the first rank of created beings, and is permitted even to approach the throne of the immortal God.

The little which we have said respecting these different links of nature, suffices to show us, that every thing in the universe is blended, that all hold together, and is united by the most intimate bonds. There is nothing without design, nothing which is not the immediate effect of some preceding cause; or which does not determine the existence of something that is to follow. Nature does not proceed by starts; every thing goes on gradually from the least to the most perfect; from the nearest to the most distant; from bodily perfection, to mental excellence. But our knowledge of this immense chain of beings, is still very imperfect, we are yet acquainted with very few of the links. However, defective as is our intelligence in this respect, it is ample enough to give us the most exalted ideas of that admirable series, and infinite diversity of beings which compose the universe; and thus we are led to that Infinite Being, between whom and us the distance is immeasurable.

OCTOBER X.

Fall of Leaves.

The ravages which the approach of winter makes in the forests and in the gardens begins now to be perceived. All plants, with the exception of a very few, lose their most beautiful ornaments, the leaves. What is the cause of this change? The most natural seems to be the cold; for as soon as the first frost sets in, the leaves begin to fall, and the vegetables to lose their verdant hue. This is owing to the circulation of the sap being checked by the cold. But this is not the only cause of the fall of leaves; for it takes place in mild winter when there is no frost; and in those trees which are preserved from the effects of the cold in green-houses. Other causes are therefore instrumental in stripping the trees of their leaves; perhaps they wither because their transpiration is not supplied by the necessary quantity of sap from the root. For it is certain that the branches increase in thickness, after they have ceased to grow in length. When, therefore, at the time that the branches still daily grow, the stalks of the leaves do not increase, their fibres must necessarily be detached from the fibres of the branches, and consequently the leaves will then fall.

But we must not suppose that these fallen leaves are entirely lost, and no longer useful: both reason and experience inform us to the contrary. Nothing perishes, nothing is useless in the world, consequently the leaves which fall from trees and plants are of some use; they grow putrid, and become manure for the earth. Snow and rain separate the saline particles from them, and convey them to the roots of trees; and when the leaves are thus strewed on the ground, they preserve the roots of young plants, form a shelter to seeds, and retain round them the necessary degree of heat and humidity. This is particularly remarkable in oak leaves; they furnish an excellent manure, not only to the tree itself, but also to the tender shoots, and they are particularly useful to pastures, by promoting the growth of the grass which they cover. These advantages are so important, that fallen leaves are never collected for the purpose of throwing them away, unless they are in such abundance that the grass is rather choaked up than nourished by them.

Leaves may serve as manure in various ways; they are laid in stables instead of straw, and thus make a very good litter for cattle: or they may be mixed with other kinds of manure. The mould they produce is particularly useful in gardens; where beds are made of it, which contribute much to the growth of fruits and young trees.

The fall of the leaf, in a moral point of view, may be considerd as an emblem of human life, and the frailty of all earthly things. "I am as a falling leaf; death walks by my side; perhaps to-day I shall wither, and to-morrow be converted into dust! My life hangs by a thread, and I may lose all my beauty and vigour in a single moment. But, if I leave behind the well-matured fruits of love, righteousness, and holiness, I shall quit this world with honour, and joyfully prepare to meet my Creator and Judge!"

OCTOBER XI.

Different Species of Earths.

We can only form conjectures respecting the interior of the earth. Those who labour in the mines have not been able to descend lower than nine hundred feet; for if they wished to penetrate deeper, the great pressure of the air would be fatal to them even if they preserved themselves from the water, which increases in proportion to the descent. But what is the depth in comparison of the semi-diameter of the earth? The interior of the earth must then necessarily be in a great measure unknown to us; for miners themselves have scarcely penetrated through the first crust. All that we know is, that when we have dug to the depth of some hundred feet, this crust is composed of different beds placed one above the other. These strata are much blended, and their direction, substance, thickness, and relative position, vary considerably in different places. Under common earth in gardens, clay and fat earth are generally found; and sometimes these are alternated by layers of sand, clay, and marl.

The division, then, of these different layers is quite arbitrary, and they may be more or less extended; but in comparing them together, that division seems to be most convenient which refers them to seven classes.

First, black earth, which is composed of putrid animal and vegetable substances; it contains many salts and inflammable matters; and is properly dung. Second, clay, which is more compact than black earth, and retains water longer upon its surface. Third, sandy earth, which is hard, light, and dry, and neither retains water nor is dissolved in it. It is the poorest of all earths, though some plants will grow in it. Fourth, marl, which is softer, more mealy, and more readily attracts moisture. Fifth, bog, or marshy earth, which contains a vitriolic salt too acid for plants. Sixth, chalk, which is dry, hard, and calcareous; yet some plants thrive in it. And, lastly, stony earth. The smoothest stones, however bare of earth, are yet covered with moss, which is a production of the vegetable kingdom; and birch will grow to a considerable height between stones, and in the clefts of rocks.

The different species of earths of which these strata are composed, are disposed with much wisdom; for only to mention the principal advantages which result from them, these different layers of sand, of gravel, and of light earth, favour the passage of fresh water, which filters through them, becomes softer, and is afterwards distributed to supply the wants of man and animals. These strata also form the reservoirs and canals of springs and fountains. And it is remarkable that these canals are found in every country upon the surface of the earth, and that they are composed of a light earth; which is sometimes mixed with a soil which is harder and more stony, and tends better to purify the water. The diversity of earths is also very useful to the vegetable kingdom; for it is owing to this, that herbs, plants, and trees grow spontaneously in certain countries, whilst in others they require the assistance of art. All that art can effect in such cases is to imitate nature, which has prepared for the plants which grow of themselves, the soil, the nutritive juices, and the degree of heat most favourable to vegetation. This variety of soils is the reason why some herbs, and plants, have their internal structure different from others of the same species. It often happens that some plants will thrive in the same soil in which others languish; and that the same fruits will taste differently in different countries. Plants, whose roots are weak, small, and fibrous, and which have not much sap, ought to be planted in a light sandy soil, that the roots may extend without being impeded; that the rain may more easily penetrate, and where the roots may not meet with too many saline and oleaginous particles. It is said that lettuce, cauliflowers, sallads, &c. may be produced fit to eat, in the space of forty-eight hours, if the seeds are previously steeped in brandy, and the soil in which they are sown is mixed with pigeon's dung, and powder of slacked lime. A certain preparation of the soil is undoubtedly necessary for vegetation.

All this should make us acknowledge the wisdom with which the Creator has disposed the earth for the better production of plants, and the happiness of his creatures. It is extremely unjust to complain of the sterility of particular soils; for the Divine Goodness has always taken care that those countries assigned to man for his abode, should produce as much as is necessary for his subsistence; and if some soils are found less fertile than others, the Creator has amply compensated the loss, by advantages much more considerable; or he has inspired man with an ardour which prompts him to exert more energy in their cultivation.

OCTOBER XII.

Wine.

WINE is a gift of the Divine Goodness, for which we cannot be too grateful. God has not only given us bread and abundance of aliments for our support; he has also graciously provided for our pleasures and enjoyment; and to render our life more comfortable, as well as to contribute to our health, he has created the vine.

No other beverage, natural or artificial, produces effects in the same degree as wine; it dissipates melancholy, and excites the most pleasurable sensations. Bread makes a man able to act, but wine renews his strength impaired by too much fatigue, renders his labour pleasant, and gives life and energy to all his exertions. Spirituous liquors do not diffuse over the countenance that lively cheerful air, which wine used in moderation imparts.

[illegible] us here reflect upon God, who has communi[illegible] such beneficial properties to the juice of a plant, of humble birth and sterile soil. How much his divine goodness is manifested in the abundance, and the variety of wines! The different sorts are very numerous, and vary in colour, smell, taste, quality, and duration; and each climate enjoys such wines as are best adapted to the nature and constitution of its inhabitants. But it is very lamentable to see how much this blessing is abused! Some legislators have interdicted its use, not from motives of improving the health and the morals of the people, but from false principles of œconomy, or absurd notions of fanaticism. To one or other of these causes must be attributed the prohibition of wine to his followers by Mahomet.

The adulteration of wine so generally practised, particularly when effected by such noxious ingredients as lime, white lead, litharge, &c. &c. is highly prejudicial, and often fatal in its consequences. What can be more cruel and horrible than for the sake of emolument, to convert what it has pleased Providence in his infinite mercy and condescension to bestow upon us for our comfort and support, into an unwholesome and poisonous drink? Surely, hardened as is the heart of man, he might feel some remorse, some compunction, in thus destroying and counteracting the efficacy of one of the richest gifts of nature. A poor unfortunate wretch, diseased and distressed, applies to wine as to a choice remedy which will relieve his misery and solace his affliction; out of the small pittance earned by his daily labour, he purchases a little portion, and hugs himself in the fond hope that his strength will now be recruited, and his pains mitigated; but the avarice of man has tainted the source, and poisoned the spring; the streams are no longer salubrious; and, instead of life-invigorating juice, a slow poison circulates through all his veins.

Wine, when pure and unadulterated, is a most valuable medicine, restores the vigour of the constitution, and imparts energy to the system; but the too frequent and liberal use of it is as hurtful, as in moderation it is beneficial.

OCTOBER XIII.

Migration of Birds.

About this time of the year, many of the birds, which during the summer frequented our fields, woods, and gardens, leave our climate, and migrate into other countries. Very few pass the winter with us; the principal species of those which remain, are the yellow-hammer, the wood-pecker, the crow, the raven, the sparrow, the wren, the partridge, thrush, and blackbird. Most of the rest leave us entirely, or conceal themselves in secure retreats. Their migration is very wonderful, and highly interesting.

Some species, without ever taking a high flight, or parting in company, steer towards the south, in quest of the seeds and fruits which they prefer, and soon return. Others, which are called birds of passage, collect together at certain seasons, and fly in large flocks to other climates. Some species are satisfied with passing from one country to another, attracted at certain times by the air and food; others cross the seas, and undertake astonishingly long voyages. The birds of passage most known, are the quail, the swallow, the wild-duck, the plover, the snipe, and the crane. The quails in spring leave the heat of Africa for the milder temperature of Europe; they fly in flocks like clouds, and often through weariness fall into ships, where they are readily taken. Swallows pursue a different method; many of them cross the sea; and many remain in Europe, concealing themselves in holes of the earth, or in marshes, fastening themselves together, claw against claw, and bill against bill. They pile themselves in heaps in places which are unfrequented by men and beasts. Wild-ducks and cranes also at the approach of winter go to milder climates; they assemble together on a certain day, and leave the country in a flock, which is generally arranged in two lines united in a point, like two sides of a triangle; a single bird leading forms the point, and the rest follow in two lines more or less extended. The duck, or crane, which thus takes the lead, cuts the air, and facilitates the passage of those which follow, whose beaks rest on the tails of those that precede. The leader holds his commission only a certain time, and wheels from the point to the rear; and whilst he rests, is replaced by another. All birds of passage, however, do not fly in flocks; some of them travel quite alone, or only in company with their females and family; others unite in small bodies. They are not long in their passage; it is calculated that they can fly two hundred miles in six hours each day, provided that they repose the rest of the time, and during the night. According to this calculation, they can pass from our climate to the equinoctial line in seven or eight days; and this is confirmed, since swallows have been seen on the coasts of Senegal eight or nine days after their departure from Europe.

These migrations cannot be too much admired; no doubt, the alteration of heat and cold, and want of nourishment, warn them to change their abode. But how is it, that when the temperature of the air is mild, and they can obtain food enough, they still go at the appointed time? How do they know that they will find nourishment, and a due degree of heat, in other countries? Why do they all migrate at the same time? as if they had before unanimously determined upon the precise day of their departure? And how, in the obscurity of night, and without knowing the country or the climate, do they pursue their course with uninterrupted perseverance? These, and many more questions of a like nature, which may be asked upon this interesting subject, are perplexing, and cannot be explained in a satisfactory manner, because we do not know enough of the nature and instinct of these animals. We may, however, acknowledge in these migrations the wise and beneficent directions of Providence. What means does not he employ to preserve and nourish certain species of birds? How tenderly and carefully he supplies their wants, when their food fails in some countries? Let us learn from this, that every thing in the vast empire of nature, is arranged with the utmost wisdom. Instinct is to birds what reason is to man, and dictates to them all that is necessary for their preservation and support. How unfounded, then, is that uncertainty and distrust, which makes us doubt the cares of Providence! The very flights of the birds should instruct us in our duty. Why do we so often abandon ourselves to discouragement, doubts, and fears? Will not that God who directs the birds in their distant voyages over the seas, also have as much love and regard for the beings whom he has vouchsafed, in his mercy, to endow with the noblest faculties and pre-eminence? And shall not man, appointed by the immediate word of God sovereign of the creation, experience the tender cares and parental affection of his Creator? "I will walk on my way with confidence; God is my leader, and I will not turn aside into crooked paths. He wills my happiness, and I cannot be miserable when conducted by so kind a Father."

OCTOBER IV.

Variety of Trees.

THE great diversity which is seen in all the productions of the vegetable kingdom, may also be observed amongst trees. Some, as the oak, are remarkable for their strength and duration. Others, as the elm and fir, are tall and slender; and others, as the thorn, and box-tree, never attain any great height. Some are knotty, with a rough bark, while others are smooth and fine, as the maple, the poplar, and the birch. Some are used to adorn the apartments of the rich, whilst others are employed in common and necessary purposes. Some are so delicate, that the least wind overturns them; and others unmoved resist the violence of the northern blast. Some of them grow to an extraordinary height and thickness; and each year, has for more than a century, contributed to their size; others acquire their full growth in a very few years. Pliny admired those great trees out of whose bark they constructed boats capable of containing thirty people; what, then, would he have said of those trees of Congo, which, when hollowed, form boats which will hold two hundred persons; or of those trees which, according to the accounts of travellers, are eleven feet in diameter, and upon which they can carry from 40 to 50,000lbs. weight. There is one of this kind in Malabar, which is said to be fifty feet in circumference. Such is the cocoa-tree; it is a species of palm, and the leaves of some of them are so large, that they will cover twenty people. The tallipot, a tree which grows in the Island of Ceylon, and in height resembles the mast of a ship, is also remarkable for its leaves, which are so large, that, it is said, one of them alone will shelter twenty men from the rain; they are so pliant when dry, that they may be folded up like fans; in which state they are extremely light, and not thicker than a man's arm. There are still to be seen on Mount Lebanon twenty-three ancient cedars, which are said to be ante-diluvian. A naturalist who has seen them, asserts, that ten men could not embrace one of those cedars; they must consequently be from thirty to thirty-six feet in circumference. The gum-trees in the American islands are generally twenty-six feet in circumference, from which we may conjecture, that the cedars of Lebanon are not so old as is reported, though it is well known that many trees attain a very great age. There are apple-trees a thousand years old.

This great diversity of trees may remind us of the varieties which we find amongst men, as to their occupations in life, their talents, modes of thinking, and the services they perform. As there is no well-formed tree in the forest that is not of some use to its owner, so there is no person in society who may not be useful in the profession which he follows. One man resembles the oak in his firmness and unbending constancy; another compensates this want of strength by complaisance and address; he is all things to all men; flexible as the willow; bowing to every breath. The man of integrity will only comply with what is just and innocent; but he who regards with indifference laws human and divine, will always coincide with that party which is the strongest, without troubling himself which side is in the right.

However different trees are from each other, they all belong to the Governor of the universe; are nourished by the same earth, refreshed by the rains, and cheered by the same sun. Would to heaven that all men, whatever diversity there is among them, would unite to acknowledge that they are all alike the creatures of God, equally the subjects of his power, and the objects of his perpetual solicitude; that they owe to him all their nourishment and preservation; and to him are indebted for those faculties which distinguish them above all the creatures of the earth. The cedar rising majestically upon Mount Lebanon, and the bramble creeping at his feet, are alike nourished by the juices of the earth, and the rains of heaven. The divine protection is also as necessary to the rich as to the poor. Men in the most elevated, and exalted ranks of society, ought always to remember that it is to God they owe all their grandeur, that they only enjoy it through his permission, and that one moment may see them overturned from their lofty seats, and mingling with their native dust. Such thoughts as these would tend to repress those emotions of pride which are too apt to possess their hearts; and would inspire them with that submission and obedience which is due to the Author and Conservator of their being.

OCTOBER XV.

Temperature in different Climates of the Earth.

At first view it would appear that the temperature of countries depends upon their relative position to the sun, since his rays fall upon the places in the same degree of latitude, in a similar manner. But experience teaches us, that cold, heat, and all variations of temperature, depend upon many other circumstances. The seasons may be very different in places under the same parallel; and they are sometimes alike in very different climates. As, then, accidental causes may make the heat very different in the same latitude, and since it is not always such as, from the distance of the sun, we might expect, it is difficult to determine precisely the seasons and temperature of every country.

The vicinage of the sea renders the climate milder; of which England and the coasts of Norway are undoubted proofs. The sea may sometimes be frozen near the shore, when the influx of fresh water is great, but this does not take place at any great distance from land, both on account of the quantity of salt contained in the sea, and its continual agitation. Thus, the sea never being cooled down to the freezing point during the winter, the adjacent countries enjoy milder temperature. The more a place is elevated above the surface of the sea, the greater is its degree of cold. The air is not only more rare, and colder, but the greatest part of the heat caused by the reflection of the sun's rays by the earth, does not fall upon high hills, but remains in the plains, and in these the heat is always the greatest. Quito is almost under the line; but from its great elevation, the heat is very moderate; such countries have generally a light and serene air, and a pretty equal temperature.

High mountains attract the clouds, hence it happens that rains and storms are more frequent in mountainous countries, than in other places; and it has been observed, that it seldom rains in the deserts of Arabia. Countries which abound in extensive forests are generally cold; the ice melts there more slowly during the winter, because the shade of the trees impedes the action of the sun's rays. The ice cools the superior portion of the air, and thus retards the thaw.

In warm climates also the heat is rendered more temperate, by the days there not being very long, and the sun not continuing a great while above the horizon. In colder countries, the days in summer are very long, which occasions the heat to be greater. The serenity of the sky, the clear light of the moon, and the continuance of twilight, render long nights very supportable. In the torrid zone, the seasons are not distinguished so much by summer and winter, as by dry, moist, or rainy weather; for when it ought to be summer, or when the sun rises to its greatest height above the horizon, and his rays fall in the most direct manner possible, the rains set in, and continue for [illegible] longer or a shorter time. In these countries, [illegible]t pleasant season is that in which the sun is at his least elevation. In the countries beyond, the weather is more changeable than in those within the tropics. In spring and autumn the winds are most prevalent. In winter the earth is frozen more or less deep, though seldom in our climate beyond three feet; in more northerly climates it freezes much deeper, and only thaws a few feet during the summer.

In all these arrangements the operation of admirable Wisdom and Goodness is manifest. In thus regulating the seasons, and the temperature of different countries, the Creator has rendered every part of the earth fit to be inhabited by living creatures. The inhabitants of the most remote regions enjoy as much felicity as is consistent with their nature; every country has advantages and disadvantages, which so nearly balance each other, that it is difficult to determine which country deserves the preference; and there is no one place on the surface of the globe, where the bounty of God is not manifested. From our climate to the most distant zones, his goodness is every where displayed. All the inhabitants of the universe experience his paternal love. None of his creatures are forgotten. All that breathe, derive from him life, nourishment, joy, and happiness.

OCTOBER XVI.

Atmosphere of the Earth.

The air with which the earth is surrounded, is not so pure and subtle as the ether; being impregnated with a multitude of particles and exhalations which are continually detached from the earth and the waters. The air thus blended, forms the atmosphere. Its inferior region, or that which is next the earth, is compressed by the superior strata of air, and is consequently more dense. The proof of this is ascertained by those people who ascend high mountains; their respiration becomes more painful and difficult in proportion to their ascents. It is impossible to determine the exact height of the atmosphere, because we cannot ascend very high in the air; neither can it be inferred with certainty, from the duration of twilight, how far the mass of air extends. Granting that the morning twilight begins, and that the evening terminates, when the sun is eighteen degrees below the horizon, and that the latter twilight is produced by the rays which strike upon the earth, and are reflected by the most elevated parts of the atmosphere, many difficulties will yet remain to be explained. However this may be, the atmosphere is divided into three regions. The lower region extends from the earth to that place where the air is no longer heated by the rays reflected from the earth. This region is the warmest. The middle region begins where the preceding one terminates, and reaches to the summit of the highest mountains, or even to the most elevated clouds; and is the place where rain, hail, and snow are formed. This region is much colder, than the lower one, for it is only warmed by the rays which pass directly through it. The third region is still colder, and extends from the middle one to the utmost limits of the atmosphere; these boundaries, however, are not exactly ascertained.

The particles which rise from the earth into the atmosphere, are of different kinds; there are aqueous, earthy, metallic, and sulphurous particles, with many others. As soon as these are more abundant in certain districts than in others, there results a great diversity in the air, and the difference is evident even at a small elevation. Heavy air is more favourable to the health than that which is light. When the air is dense, it is commonly serene, whilst a light air is generally accompanied with clouds, rain, or snow.

An air too dry, is very injurious to the human body; but this is seldom experienced, except in sandy countries. A very moist air is equally unwholesome, by relaxing the system, and impeding the insensible perspiration. When the air is very hot, great languor and debility are produced, with copious perspiration. And when it is very cold, rigidity, obstructions, and inflammations, are the consequences. The most salubrious air is that which is in a just medium between all these extremes.

It is in the atmosphere that clouds, rain, snow, hail, dew, thunder, and various meteors are engendered. To the atmosphere we owe the morning and evening twilight; as the rays of light are refracted and reflected, and bent in different directions in this volume of air, we see them before the sun rises, and enjoy them some time after he is set. Hence, those people who live under the polar circles, enjoy during the winter some rays of light, even while the sun is yet below the horizon. The atmosphere is the habitation of the winds, which have so much influence upon the fertility of the earth, and the health of man. If the air was to be in a state of uninterrupted serenity, cities and provinces would soon be deprived of their inhabitants, and exchange their gaiety for the dreariness of a desert; if occasional storms and tempests did not some times rage, and by their ebullitions agitate the calm air, the whole world would become one vast sepulchre, in which every living creature would moulder into annihilation.

What great reason, then, have we to bless and to adore our Heavenly Father for this happy arrangement of nature; and to acknowledge with awe and reverence that Wisdom which has regulated and directed the vast machinery of the universe, for the greatest possible felicity of every being which enjoys life, reason, or instinct.

OCTOBER XVII.

Proportion between Births and Deaths.

THAT God has not abandoned to blind chance the lives of men, and the preservation of the human race, but that he watches over them with paternal care, is evident, from the exact proportion in which, in all ages and countries, men enter and quit this stage of existence: so that the earth is neither destitute, nor too full of inhabitants.

The number of births generally exceeds that of deaths; for it has been calculated, that if ten persons die annually, twelve or thirteen are born. Thus the human race is continually multiplying. If this was not to be the case, and the proportion of deaths exceeded that of births, a country would be depopulated in a few centuries, particularly as the population of a country may be effected by various accidents. The principal obstacles to the increase of the human species are war, pestilence, and famine; celibacy, and crowded cities where at least as many people die as are born.

Baptismal registers prove that more males than females are born; the proportion being nearly twenty-one to twenty. But war, death, and various accidents to which men are exposed, preserve an equality between the sexes; in towns females are even more numerous, but in the country the males preponderate.

The number of children relatively to that of families, is also regulated with the greatest wisdom. In sixty-six families, it is computed that only ten chil-[illegible] are annually baptized. Out of fifty or fifty-four [illegible] in a populous country, there is only one marriage each year; and each marriage, taking one with another, produces four children; but in large towns only thirty-five children are reckoned to ten marriages. Men capable of bearing arms, generally constitute the fourth part of the inhabitants of a country.

By comparing the bills of mortality of different countries, it is found, that in those years which are not remarkable for any destructive disorder, such as an epidemic, there dies in villages out of forty people, one; in small towns, one out of thirty-two; in middling size towns, one in twenty-eight; in very populous towns or cities, one in twenty-four; and in a whole province, one out of thirty-six. Out of a thousand people, twenty-eight annually die. Of a hundred children that yearly die, three are always still-born; but scarcely one in two hundred dies in the birth. Of the hundred and fifty women who die, only one dies in child-bed; and out of four hundred deaths, only one happens in labour.

The greatest mortality amongst children is within the first year: out of a thousand infants, two hundred and ninety-three die before they have attained a year's growth; but between the first and second year of their age, only eighty out of a thousand die; and in the thirteenth, fourteenth, and fifteenth year, the number of deaths is so small as not to exceed two in a thousand. This, then, is the period of life in which there is least danger. It has been observed, that more women than men have attained to the age of from seventy to ninety years; but that more men than women pass their ninetieth year, and reach a hundred. At least three thousand millions of people may live at the same time upon the earth; but there is scarcely one third of that number, or, at the most, one thousand and eighty millions, of which six hundred and fifty millions are in Asia; one hundred and fifty millions in Africa; one hundred and fifty in America; and one hundred and thirty millions in Europe.

The most natural inference to be drawn from all this is, that God has the most tender solicitude for the life of man, and that he regards it as being very precious; for if the Divine Wisdom had not operated, how could the proportion between births and deaths be so equally maintained, and so admirably preserved at all times and in all places.

OCTOBER XVIII.

Ravages in the Kingdom of Nature.

We now see that even beautiful nature, which in spring ravished our senses, and procured us so many diversified pleasures, is subjected to the law common of all created things. Its beauties begin to disappear, and every day brings new changes, each one more gloomy than the last. Such is the lot of nature, that it contains in itself the sources of the most afflicting devastations.

What ravages are occasioned by the overflowing of seas and rivers, heavy rains, and the melting of ice and snow! Whole villages inundated, fruit trees torn up, corn fields desolated, and flocks destroyed, present to us the sad monuments of the destructive force of the elements. A shipwreck appears to be a less fatal catastrophe; yet some new commonwealth might have been formed by the men thus entombed in the deep; and immense sums, the collection of ages, are lost in a moment. Whole families are ruined by a shipwreck; the aspect of the ocean perturbed by a storm, its billows swelling with rage and white with foam; the piercing cries of the fear-struck mariners, and the crash of the vessel against some hidden rock, are dreadfully terrific!

The calamities occasioned by a long drought and intense heat are also very great. Herbs and plants languish, the earth is dried up, and we are nearly stifled with burning dust. The waters become putrid, and form a fatal drink for the drooping herds. Heat and putrefaction prodigiously multiply insects; which destroy every thing, eat up the produce of the fields, and if they die to day, revive to-morrow in new generations. Famine, that terrible precursor of death, marches with hasty strides, and pestilence speedily follows. One year's barrenness, a war, or a contagious disease, may occasion all these evils.

What terrible chasms and ravages are occasioned by an earthquake! Far within the bowels of the earth, the pestilential vapours are extricated by a destructive fire, which carries with it death and dismay. Suddenly, and often at the dead of night, when nature is wrapped in sleep, the earth bellows and shakes; opens and swallows up thousands of people, who are thus summoned, without time for repentence, before the throne of the Almighty! At the awful spectacle of nature, convulsed by earthquakes and volcanoes, we may justly say, how imperfect is every thing but the Creator himself! Many people pay that adoration to nature, which they owe to God, and forget that it is he who gives every beauty and pleasure which we enjoy in nature. Let us learn the true condition of all terrestrial things and acknowledge the advantages that the love of God has over every thing to which our hearts can be attached. To experience delight in the contemplation of his august attributes, to enjoy a portion of his grace, and to feel that he is our sovereign good, is to triumph over all the desolations of nature. What can be more proper to increase our love and our gratitude for him, than to call to mind those calamities, which his wisdom converts into blessings? Those apparent deracinations of nature, prevent much more fatal evils, which would certainly take place, if the destructive matters, fires, and vapours, were to remain inclosed in the bowels of the earth. Volcanoes and inundations often present to us the most terrible calamities; burning heats consume the earth in one place, whilst in another it is deluged with water. Pestilence and famine sweep of a number of wicked people from the earth; and the extraordinary mortality which sometimes prevails amongst men, is a very wise means to preserve their number in due proportion, and to prevent their population being too great.

When we are merely spectators of the devastations which sometimes happen, and are not directly interested in them; our gratitude to the Supreme Being who has spared us, should be marked by our sentiments of compassion and sympathy for the unfortunate sufferers. We should never be insensible to the misfortunes of our fellow-creatures, nor hear with indifference the recital of calamities, however remote are the people who suffered. In the immense chain of mundane events, there is not a single link with which we have not some connection, more or less distant. Were the unfortunate people who have experienced so many disasters, greater sinners than ourselves? Why are they fallen, whilst we yet remain? Are the regions we inhabit less contaminated by crimes, than those countries where earthquakes and volcanoes makes much extensive ravages? The final catastrophe of nature will be still more terrible to us. The world is not eternal; after having experienced a succession of every species of calamity, the period of its utter destruction will arrive. Nature now flourishes, but visibly grows older. It is only by force, industry, and labour, that we now obtain from her, what she spontaneously produced to our ancestors, and what they gathered without trouble. Perish then, thou earth, the place of our pilgrimage, since to perish is thy destiny! We have here no continuing city; let us, therefore, seek and know the city which is to come, where lives the eternal God in the midst of the children of holiness.

How I mourn over you, ye cities and desolated villages! How my soul longs to fly to your assistance, to deliver you from bondage, and to divide my bread with your unfortunate inhabitants! Humble yourselves, ye afflicted, under the mighty arm of God, and bear with patience the trials to which he subjects you. Remember your brethren who have experienced similar misfortunes. They who have been your companions in misfortune, have now their wounds healed, and their burned houses changed into palaces.

To destroy and to create, is, and will be, to the end of time, the prerogative of God. If he never destroyed, we should not behold new creatures; we should not have occasion for acts of resignation and patience; we should not sufficiently feel the value of that religion, which strengthens us in prosperity, consoles us in adversity, and makes us superior to misfortune.

OCTOBER XIX.

Circulation of the Blood.

Of all the changes which takes place in the animal body, none are more important and mysterious than the circulation of the blood. There is in this motion a striking grandeur, which makes us feel the limits of the human understanding, and inspires us with a profound admiration for the supreme intelligence of our Creator.

The blood continually circulates in our bodies; the heart, which is the principal organ of circulation, is placed within the breast, between the two lobes of the lungs; it is a fleshy substance, and has two cavities, which are separated from each other by a valve. The heart is in continual motion, alternately contracting and dilating. From the left ventricle a large artery, called the aorta, proceeds, and soon divides into several branches, which ascend and descend by innumerable ramifications; become smaller as they proceed, and penetrate every part of the body. When the right ventricle contracts, the blood is propelled into the arteries with so much force, that it reaches the minutest extremities of their most remote ramifications. This motion is called the pulse; which is merely the effect of the pulsation of the heart, and is quicker or slower according to the frequency of its contractions. When the blood arrives at the extremities of the arteries distributed through the body, nature employs it in the wisest manner. Certain vessels absorb the watery, oily, and saline parts. In some parts of the body, where the arteries are distributed, the secretion of milk, fat, and various fluids is performed. The remaining portion of blood flows into the extremities of the veins, in a manner that, with the aid of a microscope, we can very distinctly perceive the red globules rolling one after another. These vessels gradually enlarge in size till they form very large tubes, which return the blood back to the right ventricle of the heart.

The blood is then propelled into the pulmonary artery, which disperses it through the lungs by innumerable small branches. It is there exposed to the action of the air, is afterwards received by the pulmonary veins, and by them is conveyed to the left auricle of the heart. This contracts and sends it into the left ventricle, which also contracting, pushes it into the aorta, whence it circulates through every part of the body.

Such is the admirable circulation of the blood in most animals. But there is still much obscurity in this interesting subject. We meet with wonders here, that prove how incapable the human mind is of explaining this work of Divine Wisdom. How wonderful it is that the motion of the heart continues uninterruptedly for seventy, eighty, or even a hundred years, without that delicate organ decaying, or being out of place! The circulation of the blood is performed twenty-four times every hour, consequently, in twenty-four hours this operation is performed five hundred and seventy-six times: and as at each pulsation the heart propels two ounces of blood into the aorta, it will be found, that in the space of an hour, there passes through the heart six hundred pounds of blood. This alone is sufficient to excite our astonishment; but how many wonderful things besides, take place in the circulation of the blood, of which we have very imperfect ideas? In short, man, whose dominion over the world every thing acknowledges, is a marvellous piece of workmanship. The most admirable mechanism, and corporeal beauty, are united in him; each of his members declare that he is lord of the creation. An innumerable multitude of invisible tubes, fashioned and arranged in a manner that infinitely surpasses human art and human wisdom, conduct, and every where throughout the body, distribute, and uninterruptedly circulate, the precious life-sustaining fluid. In this universal motion, this continual ebbing and flowing, every thing is regular and admirably directed; every thing is in its place in the most perfect harmony; nothing is discordant, nothing clashes, nothing impedes, and nothing precipitates its course.

The same admirable circulation that we observe in animals, obtains throughout nature. The sun, the moon, and the stars, perform their appointed revolutions, with a determinate and uniform motion. There is even a continual circulation in the elements the air is not only in perpetual motion, since it never ceases to circulate round the earth, but water also continues its course without cessation. The rivers pour their streams into the sea; and from the vast surface of the ocean, vapours arise which form clouds; these are precipitated in showers, which penetrating the mountains, form springs of water that insensibly increase till they swell into rivers, and again return to the parent ocean.

The earth, ever fertile, annually produces flowers, and fruits; and yet is never exhausted, because the continual circulation of the nutritive juices repairs its losses, and restores to it again what it has given to us. All these revolutions of nature bring us to a first cause, which has so arranged the world, that all beings are continually in action; circulate, move, and act, in an insensible labyrinth of changes, till they return to their original place, and commence again the course which was prescribed to them.

OCTOBER XX.

Proportion of various Parts of the Human Body.

God has formed the human body according to the wisest rules, and he has established the most exact proportion even in the minutest parts To be convinced of this, we have only to calculate the height and the bulk of the human body from certain specific measures. The height of the body is generally divided into ten equal parts, which, in technical language, are called faces, because the human face was the first model of these measures. The first face comprehends the whole of the visage beginning at the root of the hair on the forehead; from which point to the summit of the head, there is still one-third of the face in height, or, what is the same thing, a space equal to the length of the nose; so that, from the crown of the head to the point of the chin, there is the length of one face and a third. Between the bottom of the chin and the hollow of the clavicles, just above the breast, there are two-thirds of a face; thus, the length from above the breast to the crown of the head, is twice that of the face, which is the fifth part of the whole length of the body. From the hollow between the collar bones to the bottom of the breast, is reckoned one face. Below the breast begins the fourth face, which ends at the navel; and the fifth extends to the pubis; which makes altogether half the length of the body. Two faces are reckoned from the beginning of the thigh to the knee, which last makes half a face. There are two faces in the length of the leg, from below the knee to the instep, which in the whole make nine faces and a half; and from the instep to the sole of the foot, there is half a face, which completes the ten faces, into which the height of the human body has been divided.

This division has been made for men in general; but in those who are of greater stature than usual, about half a face more is found in that part of the body which is between the chest and the pubis; and it is the superior length in this place which constitutes a proper size.

When the arms are extended so as to form a straight horizontal line, the distance between the extremities of the middle fingers of each hand, is equal to the length of the whole body. From the hollow between the collar-bone to the joint which unites the shoulder-bone to the arm, is one face length. When the arm depends all its length, it is computed at four faces; two between the shoulder and the extremity of the elbow, and two more from the elbow to the tip of the little finger, which make five faces for each arm; consequently, the length of both equals that of the whole body. The hand is one face long; the thumb the third of a *face*, which is also the length of the great toe; the length of the sole of the foot is equal to a sixth part of the height of the whole body. The bulk of the body and of the limbs have also their measure. The thickness of the finger is generally the thirty-sixth part of its length; that of the little finger is the forty-eighth part; three times the thickness of the thumb, gives that of the hand; and six times the thickness of the hand equals that of the whole body.

The height of the human body varies considerably. The most perfect stature is from five feet five to five feet nine inches; the middle size is from five feet and an inch to five feet four; and the little size is below five feet. Women are generally two or three inches shorter than men. Their breast is more prominent and elevated, so that generally the capacity of the chest formed by the ribs, is deeper in women, and broader in men, in proportion to the rest of the body. The hips of women are much wider than those of men, the bones which form the pelvis being much larger.

Man has a greater proportion of brain than any animal of the same dimensions, even more than the horse or the ox. A man that weighs a hundred pounds, has usually four pounds of brain. Infants born at their proper time, generally weigh at the most eight pounds, and at the least five pounds; their greatest length is one foot and eleven inches, and the least one foot six inches.

The human body, considered as a whole, or in its parts separately, will appear to be formed in the exactest proportion. Every thing in it is regular, and arranged with the greatest harmony, both with respect to its size and figure, and the situation of the parts themselves; not one of which is greater or less than the connection it has with the other parts, and the general utility of the machine, require. No form or situation can be imagined more suitable to each part, or more advantageous to the whole of the members. Though some varieties and irregularities may appear, such as monsters, and deformed men; they do not at all destroy the principal design of the body. But if certain disproportions in the size, figure, and position of the parts, are consonant with the great end for which the body was formed, they certainly diminish the beauty and elegance of the form, and the graces of the exterior. How grateful, then, ought well-formed persons to be; and those whose limbs are moulded in just and beautiful symmetry!

OCTOBER XXI.

Navigation.

To reflecting minds, the subject of navigation may give rise to very important and pleasing meditations. At the same time that our curiosity is interested and gratified, we gain a new source of pleasure. We ought not only to regard navigation on account of the advantages which it procures us; but we ought also to regard the mechanical part and the motion of ships.

Is it not truly astonishing that so huge and heavy a mass as a ship, can float upon the water? The weight of a ship is very great, and little attention is requisite to convince us, that its pressure on the water must be prodigious. A man of war, whose complement of men is eight hundred, generally carries provisions enough to supply them with nourishment for the space of three months; and mounts from seventy to a hundred guns. Now allowing each man to weigh one hundred pounds weight, and each gun nine hundred; (though some weigh more than 4,000lb.) and supposing that each man consumes only three pounds weight of provisions in the course of the day, this very moderate calculation will, however, make a totality of more than three hundred thousand pounds. Besides this, we should reckon the weight of the vessel itself; the rigging, and a great store of materials necessary to keep the ship in repair; and powder and ball for the guns; all which equal, if not exceed, the preceding amount. Yet this enormous mass of upwards of six hundred thousand pounds weight, is put in motion by a gentle breeze. Does not this appear inconceivable, and contrary to the laws of nature? It is, however, perfectly natural, and should the contrary happen, it would be very extraordinary. It is not altogether the wind that drives along this mass; the ship, with its whole cargo, swims in the water. But how does so heavy a body float? How can the water, whose particles do not adhere together, have force enough to support such a mass? It is the effect of a proper balance; the vessel sinks till the volume of water which it displaces is equal to it in bulk. Suppose the ship is one hundred and twenty feet long, and fifteen broad, and that it sinks to the depth of two feet, that is, three thousand and six hundred feet of water, or so much cargo, since one takes the place of the other. Thus, the river is not more burthened with the vessel, than it was with the water which she displaced.

Formerly navigation was much more dangerous and laborious than it is at present. The most hardy sailors had not confidence sufficient to venture far out in the open sea; but confined themselves to coasting along the shore. Since the invention of the compass, they cross the seas with more certainty and security. Before this happy discovery, to make a short sea voyage was considered as very w[illegible] In the time of Homer, it required great preparation, and frequent deliberation, before his heroes could determine upon crossing the Egean sea. The expedition of Jason and the Argonautes, to the Island of Colchis, was regarded with wonder, as an exploit that would crown the achievers of it with immortal honour. But what were all these in comparison of our sea voyages? The compass enables us to perform the longest voyages; the magnetic needle always turning towards the north, informs the navigator of the regions where he is, and of the countries to which he directs his course. In the gloom of night, in cloudy days, in the middle of the ocean, this instrument serves him as a guide, and leads him from one region of the globe to another.

The advantages of navigation are very great, and deserve our utmost gratitude; we are indebted to it for many of the necessaries of life. Without it, we could not procure, or at least not without great difficulty, those spices and medicines which we receive from different countries. It would be extremely inconvenient to have all our necessaries brought by land. The following calculation will sufficiently prove this assertion. The freight of a ship is reckoned by tons; and many ships are of six hundred tons burthen: now a ton is equal to two thousand pounds weight. Supposing it to be carried by land in waggons with four horses; and that each horse would draw one thousand pounds weight; three hundred four-horse waggons would be required, with at least as many men, to transport this load. How dearly then should we purchase riches from distant parts of the world, and even some of the most necessary things of life! We ought also to regard navigation as a signal blessing, in being instrumental, in the hands of God, to the promulgation of the Gospel of Christ in the most remote countries of the earth. And again, we, whose lot is not that of daily braving the waves of the ocean, and exposing our lives to continual dangers, to obtain wealth, or to procure the means of existence, ought to be very grateful to the Almighty; and whilst secure from such perilous encounters, living calmly in the bosom of our families, we ought to offer up to heaven our prayers for those who are obliged to traverse the ocean, and undertake distant voyages, whether for their private emolument or for the public good.

OCTOBER XXII.

Beasts of Burden.

ANIMALS of this description do us so much service, and are so extremely useful, that they well deserve a particular investigation. We are generally satisfied with making them subservient to our necessities, either in supplying us with food, or assisting us in our labours with their strength; while, through ignorance or indolence, we neglect to consider the connection they have with the whole creation; and to reflect upon the wisdom and goodness of the Creator, manifested in the production of these useful animals.

Of all domestic creatures, the horse is the most serviceable and tractable. He suffers himself to be employed in cultivating the earth, he carries for us all that we want, he submits with docility to all kinds of labour, and shares with us the pleasures of the chase, and the dangers of war, while he is content with a moderate and frugal supply of food. He gives up his own being to exist only by the will of another; he even anticipates the commands of his master, which he executes with wonderful promptitude and precision; he refuses nothing, exerts all his strength, and sometimes dies in the act of obedience. Nature has given him a disposition to love and fear man, with a sensibility alive to the caresses which sweeten his slavery. The horse excels all other animals in fineness of figure, and beauty of proportion. The elegant symmetry of his shape, and well-formed limbs; the outline of his head and neck, give him a quick and lively appearance, admirably contrasted by the boldness of his chest; his carriage is noble, his march firm and majestic; and when roused to action every limb denotes his power and energy; every muscle shews his activity; and his defiance of danger is expressed by the fire of his eye, and the thunder of his nostrils.

The ox is far from having the graceful elegance of the horse; his large head, his legs too thin and short in proportion to the bulk of his body; the smallness of his ears, his stupid look, and heavy pace, would seem to be imperfections; but he amply compensates his want of beauty by the important services which he renders to man. He is so strong that he readily carries very heavy burdens; and is satisfied with mean fare. Every part of this animal is useful; his blood, his hide, his hoof, his flesh, and his horns, &c. are all employed for different purposes. His very dung is a most excellent manure for the earth. In this animal the organs of digestion are very remarkable: he has four stomachs, the first of which will contain forty or fifty pounds weight of food; the third stomach has eighty-eight folds, which assist the process of digestion, whilst the stomach of sheep and goats have only thirty-six.

The ass, however despised and unprepossessing his external appearance may be, has, nevertheless, some very excellent qualities, and is of great use. He is not impetuous and fiery like the horse, but quiet, simple, and well tempered. He has no haughtiness, goes peaceably on his way, and bears his burden without noise or murmur; he is temperate both in the quantity and in the quality of his food; being contented with thistles and the commonest herbs; he is patient, vigorous, indefatigable, and renders his master the most important and constant services.

How can we daily use these animals, and not at the same time think upon our Creator, who has formed them, and given them properties by means of which they become so useful to us? It is worth the attention of a reflecting mind, to know, that the number of beasts of burden is much greater than that of wild beasts. Can we, without emotions of gratitude, reflect upon the goodness of God, which has given us supreme dominion over these creatures; the ability of taming them, and converting them to the most useful purposes, and the power of enforcing their obedience? This command over animals is one of those gifts of God, by which man may every moment feel the excellence and superiority of his being. Since, then, it is to the Almighty himself, that we owe this power and dominion, how extremely unjust it would be to abuse it by our ill treatment of these creatures, whether in over-working them, or in any other way treating them harshly.

OCTOBER XXIII.

Winter Seed-Time.

A GREAT part of the food intended for the use of man and other animals, is at this time committed to the earth; and when the farmer has sown his winter's corn, he begins to enjoy some repose. He will soon have the gratification of seeing his fields spread over with a beautiful verdure, giving promise of a plentiful harvest. Nature is secretly working whilst the germ is unfolding; her operations may be discovered by extracting from the earth some of the grains which are beginning to germinate. Two days after a seed has been sown, the juices which make it swell, are conveyed to the germ, and cause it to sprout. The germ is always placed at one of the extremities of the seed; and that part of the grem which is nearest the outside, becomes the radicle of the future plant; while that part which is towards the interior of the substance of the seed, becomes the stem, and the head of the plant. Twenty-four hours after the corn has been sown, the germ, which begins to pierce the coat of the grain, and to disengage itself, puts forth its root and stalk. the root is at first enveloped in a sheath, which it bursts. In a few days, other roots shoot out at the sides, having extricated themselves from the sheath. By the fifth or sixth day, the corn begins to appear with a small green point above the ground; it remains a considerable time in this state; till, as the season advances, and fine weather favours, the ear bursts from its coats, which hitherto had sheltered it from all the variations of temperature.

From this consideration, we may with propriety proceed to reflect upon the nature of human life. Our present existence may be regarded as the germ of a future life; and our state here as that of our seed-time, when we can discover very little growth. The luxuriant ear, the ripe sheaves, and mature fruit, we cannot yet see, neither is the harvest to be reaped upon the earth. We live in hope. The husbandman having sown his field, abandons his seed to corruption, to rain, to storms, and to the sun's heat, and does not yet know what will be the result: so does it happen with regard to spiritual seed. Let us not exult in what we sow, nor be cast down if we do not immediately see the fruits; neither let us ever be weary with sowing to the spirit; and perhaps our good works, however small, may hereafter have the most beneficial consequences. Now that our ground is sowed, let us patiently, and without anxiety, wait till we gather the fruits of our labour, and, like the pious husbandman, let us pray unto God, to crown our fields with his blessings.

OCTOBER XXIV.

Particular Providence.

It would be very unfortunate for the world, if there was any foundation in that principle of the incredulous, that God is only concerned for the totality of beings, and the preservation of society at large, but has no care of particular individuals. The absurdity of such an opinion is evident. Both the dictates of reason and the sentiments of religion teach us to believe in a God, whose Providence extends itself to every creature in particular, and to every part of which that creature is composed. Let it not be imagined that it is beneath God to regard individuals. The whole universe, as well as the smallest particle of dust, is nothing in comparison of the infinite Being. What, then, can we call little or contemptible? Is there not less distance between an individual and a whole nation, than there is between them and the stars, which appear so small to the eyes of men? The least reflection suffices to convince us that in comparison of that God to whom a million of years are no more than a day, and the whole universe as a drop of water compared with the ocean; there is nothing which is in itself either great or little; nor any event, however inconsiderable it may be, that is unworthy of his attention. If we take the meanest plant, or the least insect that we can dissect, we shall discover, [illegible] in its least particles, the same wisdom which is displayed in the structure of the whole. The least fibre contributes as much to the perfection of the whole animal, or plant, as these do to the perfection of the whole species, and as the entire species does to the perfection of the universe. If then, God has not disdained to form these creatures, which appear so despicable, why should it be considered beneath him to preserve them? And if the parts were not complete, how could the whole be perfect; or how could the whole species be preserved, unless that preservation extended to individuals?

Reason teaches us this, and Revelation completes our conviction. It informs us, that the very hairs of our head are numbered. Thus, the meanest part of our body, one of those hairs, thousands of which in the course of our lives, we lose without perceiving it, or suffering any inconvenience, even these are numbered. Hence, our Saviour drew this inference, that with much greater reason God interests himself on our account, and condescends to favour us with his regard; and this is the more evident, in as much as all men have been redeemed by the blood of his well-beloved Son, and have gained new favour in the sight of God, by becoming the disciples of the blessed Jesus. O Eternal Providence! I adore thee in Jesus Christ. With the liveliest emotions of gratitude, I adore and bless thee, O God! Before the foundation of the world, thou designed my happiness; before my supplications could reach the throne of thy grace, or my grateful aspirations ascend to heaven! And is it possible that thou canst now forget me? No! thy only Son, the blessed Redeemer, has undertaken my salvation, and suffered even the most cruel torments on my behalf. Let us, then, not be staggered by the raillery of vain and wicked men. Let us confide in that God whom the infidel would persuade us takes no care of his creatures. Let us consider that we were not formed for this life only, but that we are to live in another world, where the wonders of God's grace and infinite power, will be opened to us in all their beauty and splendour.

OCTOBER XXV.

Division of Time.

Time is measured and divided according to the revolutions of the heavenly bodies, particularly those of the sun and moon. These two spheres have the greatest influence upon the state of man. The revolution of the moon serves only to mark the division of time upon our globe; while that of the sun is doubtless instrumental in regulating that division in all the planets which revolve round him.

Day is that portion of time, which the earth expends in revolving round its own axis. That space of time during which the sun is above the horizon, is called the artificial day; it is the time of light, and is determined by the rising and the setting of the sun. The time of darkness, when the sun is below the horizon, is called night. Day and night taken together make the solar day, which is divided into twenty-four parts, called hours; and each hour is again divided into sixty equal parts, called minutes; each minute into sixty seconds; and each second into sixty thirds. This division of the day into hours, minutes, &c. is indicated by the movement of the shadow occasioned by the gnomon of a sun-dial; or by the hands of a clock. Well-constructed sun-dials constantly mark the true time of the sun; but other time pieces, which require to be regulated by the mean time of the sun, are frequently out of repair. Most Europeans begin their day and their hours at midnight, from which they reckon twelve hours till noon, and twelve hours from that to the ensuing midnight. The Italians begin their day at sun-set, from which to the following evening they reckon twenty-four hours. The Turks begin their day a quarter of an hour after sun-set, from which they count twelve equal hours; and when they are elapsed, they reckon twelve more to the following evening. The Jews begin their day at sun-set, from which they number twelve equal hours to sun-rise, and as many from his rising to his setting; consequently, the hours of their day are longer or shorter than those of the night, in proportion as the day is longer or shorter than the night.

A week is the space of seven days. A solar month is the time which the sun takes up in passing through one sign of the zodiac; but these months do not begin and finish exactly when the sun enters into a new sign. The lunar month is the space of time which elapses between two new moons, that is, twenty-nine days, twelve hours, and forty-four minutes.

The solar year comprises twelve solar months, or the time which the sun is in passing through the twelve signs of the zodiac; and this is generally reckoned to be three hundred and sixty-five days, five hours, forty-eight minutes, and fifty-seven seconds. These years are at present used by most of the people of Europe. The lunar year is that space of time which comprises twelve lunar months, or twelve revolutions of the moon round the earth. It is composed of three hundred and fifty-four days, eight hours, and forty-eight minutes. The Jews and the Turks use this year; and to make it correspond with the solar year, they often intercalate a whole month. Our common year begins ten or eleven days after the sun has entered the sign of Capricorn.

However trivial and unimportant these measurements, and divisions of time, may appear in themselves, they are still of great consequence in their application to the moral life of man. The hours, days, weeks, months, and years, which compose the period of our present existence, have been granted to us, that by the proper use of our faculties, we might fulfil the end of our creation. How, then, do we employ this precious time? Minutes and seconds are trifles in our eyes, which do not deserve our attention; yet nothing is more certain than that he who makes light of minutes, will be equally prodigal of his hours. Are we even more economical of longer periods? If from all the days that are allotted us, we deduct those which have been entirely lost with respect to our immortal souls, how little of real and effective life will remain!

How distressing and humiliating is the reflection, that of the hundreds and thousands of hours which Divine Goodness has entrusted us with, to devote to the great and eternal interest of our souls, so many have been shamefully consumed in separating ourselves from God, the best and tenderest of fathers! How many years are passed in idleness, and in vice, in gratifying our passions, and injuring our neighbours! How inconceivably quick the few moments that yet remain, fly away! Hour after hour imperceptibly glides along, and are irrecoverably lost; and an hour is much to a man who can so easily calculate by hours, the period of his real and effective life.

Teach us, O Lord, so to number our days, that we may apply our hearts unto wisdom; and that henceforth we may make a proper use of that time which thou mayest still condescend to grant us; that so we may gain a portion of grace through Christ, and assure unto ourselves a glorious and happy eternity.

OCTOBER XXVI.

The End of Summer.

The last rays of the summer sun now fall feebly on the earth: every thing is changed: that country which so lately bloomed in verdant beauty and blushing charms, is becoming poor, withered, and barren. We no longer see the trees rich in blossom, nor the spring gay with verdure; the magnificence of summer displayed in a thousand variations of colours, whose richness is relieved by the beautiful green of the meadows and waving groves, is no more; the purple hue of the vine has faded, and the gilded ears no longer ornament the fields. The last leaves of the trees are falling; the pines, the elms, and the oaks, bend beneath the blasts of the fierce north wind; and the fields which have lavished upon us so many gifts, are at length exhausted.

These sad changes must necessarily diminish our pleasures. When the earth has lost her verdure, gaiety, and beauty; when the fields are swampy, and gloominess reigns, man is deprived of many of those delights that he receives through the medium of sight. When the earth is thus destitute, nothing is seen around but a rugged and uneven surface. The songs of the birds no longer rejoice our ears, and there is nothing that recalls to our minds that universal delight which we so lately shared with all animated beings. The melody of the birds yields to the murmuring of waters, and the howling of the winds. The fragrance of the fields is gone; and the sense of feeling is pained by the impression of cold and humid air.

But in the midst of these gloomy prospects, we have reason to acknowledge how faithfully Nature fulfils the eternal law prescribed to her; of being useful at all times and seasons of the year. Though, at the approach of winter, the country is desolate, and stripped of its most beautiful ornaments, it still presents to a properly organized mind the image of happiness. We may say with gratitude, here we have seen the corn grow, and these dry fields clothed with abundant harvests; and though the orchards and gardens are now deserted, the remembrance of the presents which we have received from them, inspires us with joy, though we are exposed to the influence of the north wind. The fruit trees have shed their leaves, the grass of the meadows is withered, dark clouds gather in the sky, the rain falls in heavy showers, the roads are impaired, and walking is impracticable. The man who has no resources in himself, murmurs at this change; but the philosopher contemplates it with satisfaction. The dry leaves and withered grass, moistened by the autumnal rain, form a rich manure to fertilize the land. This consideration and the sweet expectation of spring naturally ought to excite our gratitude for the tender cares of our Creator, and inspire us with a perfect confidence in him. Whilst the earth has lost its beauty and external charms, and is exposed to the murmurs of those it has nourished and delighted; it has commenced its labours anew, and is busily employed in secret working for the future good of the creation.

OCTOBER XXVIII

Magnificence of God displayed in the Creation.

"God has manifested himself in the creation as a Being infinitely wise." There is no creature, however useless it may appear, which has not its particular destination; and all are formed in that way which is best adapted to answer the purposes of their existence. This is at least the case with all those with which we are acquainted; and by analogy we may conclude it is the same with those that we do not know. If we begin with the sun, and descend to the smallest plant, we shall be obliged to acknowledge that, to be properly adapted to the end for which they are designed, these creatures could not be formed otherwise; and that for the purpose they are to answer, they have no defect. The least parts of every creature are evidently appropriate to its destination; they accomplish the functions prescribed to them by nature; and were any of its parts to be taken away, the whole animal would be imperfect, and unable to fulfil the end of its existence. How wonderful is that whole which results from the connection and relation which all creatures have with each other! Each is in its place, each has its proper functions, and these are essential to the perfection of the whole; neither could any of them be wanting or imperfect, without more or less disorder resulting.

If, then, we represent to ourselves the Being who has formed this innumerable multitude of creatures, animate and inanimate; who has not only designed each of them to fill up certain places in the creation, but who has also disposed and arranged all their parts in a manner the best adapted to their ends, without any thing superfluous, without any thing defective; who, by the inclination of an immense number of individuals, has altogether formed a whole, where the most perfect harmony reigns, shall we not be struck with admiration, and pronounce with reverential awe, "O the depth of the wisdom and the knowledge of God!"

"God has manifested himself in the creation as a Being infinitely wise." He has every where diffused life and motion. How numerous are the animated beings his beneficent hand has produced! From the beginning of the world, man has always laboured to become acquainted with the different beings that inhabit the earth, and to this day, he continues to discover new species which were before unknown. Life is a blessing, even to the meanest worm that crawls on the earth; what pleasure, then, must the Almighty derive from doing good, since he has bestowed upon so many creatures the felicity of existence. But of what use would life be, if it was destroyed as soon as created? The Creator has taken care that every creature shall live long enough to fulfil the end of its creation. He has assigned to each the place it is to inhabit, and every individual is provided, immediately upon its entering the world, with all that is necessary to the preservation of its life. Many animals bring with them into the world, the instinct and degree of industry necessary to enable them to obtain nourishment. Others, as man, are at first supported and instructed by their parents; and the earth's fertility for the benefits of her inhabitants is inexhaustible: Nearly six thousand years have elapsed since she began to support the many millions of beings that live upon her productions; and though the world should endure twice six thousand years longer, it cannot be doubted that a sufficient supply of nutriment would still continue to be afforded to the generations yet to come.

With life, how many pleasures and delightful sensations has not the Creator granted to all animated beings, and especially to man? How magnificently he has adorned and beautified the world he has destined for our temporary habitation! what enjoyments he permits us to taste in social life! what tender, fond, and endearing ties, what affection, and sweet emotions cheer our hearts! And can ingratitude to a Being thus merciful and beneficent, ever debase the minds of men who are endowed with reason, and the faculty of knowing and loving the great Author of their existence? Forbid it, heaven, and let us acknowledge in joyful accents that the earth is full of the blessings of God, who manifests himself in the creation as a Being of all power.

This power, infinite as the universe, boundless as [illegible] heavens, plainly manifested in every creature, is [illegible]ore particularly perceptible in the extremes, in the greatest objects of nature, and in the least. What but an infinitely powerful Being, surpassing all human conception, could have formed the firmament, that immense extent, that boundless space in which such myriads of spheres continually, without interruption, roll their vast orbs? Who but himself could have so long preserved the vast fabric steady upon its foundations, as if to endure for ever, and yet sustaining a concatenation of motions varied as they are wonderful? Who else could have fashioned a body too brilliant for mortal eyes to behold, whose splendour is ever undiminished, and fix it at such an awful elevation in the heavens, as at once to command the universe, and receive the homage of numerous worlds which, ever circling round, derive their radiance from this vast luminary of day?

Could any thing short of Infinite Power impart motion to the earth, the moon, and the stars; prescribe limits to their course, and urge their revolutions in endless succession?

Are we desirous of considering the presence of Divine Power in the smallest objects, we shall find it equally manifest, incomprehensible, and wonderful, as in the grandest and most sublime? Examine the very dust that strews the earth; mingled with it are myriads of insects, thousands of which united would not make up the bulk of a single grain of sand; yet each of these has its limbs, organs, and senses; each has its instincts and sensations; and to each the love of life is dear, and the desire of preserving it ardent. View the grass of the fields, the blossoms of the trees, study well their structure, origin, and use; and you will every where throughout the vast extent of nature, discover wonders, that are worthy of their heavenly Author, and capable of calling forth all the gratitude and veneration which a virtuous and noble mind can feel, for a Being whose attributes fill the universe with glory.

OCTOBER XXVIII.

Laws of Inertia.

INERTIA is that power of resistance, by which all bodies have a tendency to remain in the state in which they are. When a body is at rest, it remains so, till some force is applied great enough to overcome its resistance; and when that is accomplished, it continues in a state of motion, from the same law of inertia which operated when it was at rest; and it now resists as forcibly those bodies which would retard its progress, as it before resisted those which impelled it to move. By this means bodies move with regularity; and the laws of motion and percussion may be exactly determined.

If the heavenly bodies did not possess this power of resistance, they could not move with so much order and regularity; and they would always require a new moving power to preserve them in motion. From this it is evident that the universe is arranged and governed by Divine Wisdom. The removal of any part of this immense edifice would derange the whole. Of what use to us would be the regular structure of plants, and of animals, with the admirable arrangement of the heavenly spheres, if none of these bodies were susceptible of motion? How simple is this law, and how wonderful are its effects! Such always are the works of God: the principles are beautifully simple; and the whole edifice is as admirable.

In contemplating the works of God, every spectator is not alike able to discover the fundamental laws upon which most of the phenomena depend; and consequently they are not equally able to perceive and acknowledge the Wisdom which directs them. This knowledge is reserved for the attainment of the philosopher, whose labours are thus amply repaid by the pure and unexhausted delight which they procure.

There seems to be a certain degree of inertia inherent in the mind, somewhat similar to that which obtains in matter. Those bodies that constantly move in the same manner, and towards the same points, acquire a tendency to persist in the same direction; and the human mind has a similar propensity for those actions which we have often repeated in the same manner. Hence the difficulty of overcoming acquired habits. We may make a most excellent use of this propensity of mind, by directing it to strengthen our habits of virtue. For this purpose we have only to repeat very often, the same good actions, till we are as much accustomed to deeds of virtue, as we before were to those of vice. This is the more important, because, without virtue, we can never retain a true and lasting tranquillity.

Whence proceed those errors which we often commit in this respect? Why do we follow, with unceasing perseverance, imaginary good, which in the end leads to destruction? Our hearts, seduced by that pride which is natural to them, and our minds, dazzled by the deceitful lustre of worldly objects, cause us very reluctantly to approach the paths of virtue. But let not the violence which we thus do to our inclinations and passions discourage us. The practisers of vice themselves are often obliged to restrain themselves in their mad career, and resist the impetuosity of their passions, in order to procure some temporal advantage, or to shun some particular evil. And this violence which they thus do themselves in resisting their sensual desires and gratifications, must be very painful and severe to men corrupted by effeminacy, and enervated by dissipation. On the contrary, what sweet emotions cheer the heart when the soul retains her command over the senses, and preserves them in that subordination which is consistent with the dignity of beings endowed with reason! By frequently exercising this command, we at length obtain that happy state, where the soul, elevated above the turbulent region of the passions, looks down with compassion upon the deluded votaries of vice, and pities the miserable victims devoted to her chains.

OCTOBER XXIX.

Wants of Men.

No creature upon the earth has so many wants as man. He comes into the world naked, destitute, and ignorant. Nature has not endued him with that industry and instinct which most of the brute creation enjoy as soon as born; she has only given him the capability of acquiring reason and knowledge. In some respects, therefore, the animals may seem to be more favoured. They are extremely happy in having no need of clothes, instruments, and those conveniences so necessary to man; and in not being obliged to exercise that variety of arts and occupations, without which we cannot procure what our necessities demand. They possess at their birth clothing, weapons, and every thing that they require; or, if they want any thing more, they can easily procure it by means of their instinct, which they have only to follow blindly. If they want habitations, they know instinctively how to construct them. Do they require beds, covering, or clothes, they possess the art of spinning or weaving them, and they can change their old garments for new. If they have enemies, they are provided with natural arms for their defence; and are they ill, or wounded, they know how to find remedies. Whilst we, who are so much superior to all other animals, have more wants, and fewer means of satisfying them.

Perhaps it will be asked, why the Creator has thus given man less natural advantages than he has to brutes? and such a question undoubtedly is excusable, if not expressed from motives of dissatisfaction or murmuring. The Divine Wisdom is equally manifested in this as in all other things. In subjecting man to more wants, God designed that he should continually exercise that ratiocinative faculty, which is given him for his happiness, and to supply the place of all the resources of the animals. And because we are destitute of the instincts which they enjoy, and that we have so many necessaries to answer, we are obliged to have recourse to our reason, to acquire a knowledge of the world, and of our own particular nature, to be diligent, active, and laborious, to secure ourselves from poverty, pain, and vexation, and to render our lives peaceable and happy. The faculty of reason also enables us to restrain our unruly passions, and preserve our minds free from the delusive influence of pleasures which might be fatal in their consequences. A few instances will suffice to illustrate this. If we could obtain without any labour, fruits, and the necessary supply of food and other articles which we daily want, we should become idle and slothful, and pass our days in uninterrupted indolence; all the faculties of the soul, for want of exertion, would become enfeebled and enervated; the links that hold society together would be broken, because we should no longer depend upon one another, and children would have no occasion to apply to their parents for support and subsistence. The whole human race must then relapse into its former barbarism, and into a state of nature; each individual, like the brutes, would only live for himself; subordination could not exist, and all mutual obligations and good offices must cease. It is therefore to our wants that we owe the developement of our faculties, and the prerogatives of humanity. They awaken the energies of our minds, give them activity and industry, and render our lives more pleasant and happy than those of other animals. Our very necessities, then, have rendered us sociable, rational, and orderly in our manners; and have led us to the invention of many useful arts and sciences. In general, an active and laborious life is advantageous and necessary to man. If his faculties and powers are not exercised, they become useless, he gradually gets into a state of stupidity, ignorance, and gross sensuality, with all their concomitant vices; whilst mental and bodily exertions, give an agreeable activity to the whole machine, and procure as much satisfaction and delight, as it stimulates to industry, to science, and to knowledge.

Natural wants, then, were necessary to render us rational, wise, social, virtuous, and happy. If, after having been nourished with our mother's milk, we had no further occasion for assistance or instruction, we should only live for ourselves; learn no language, nor make any use of our reason; stupified, and in the profoundest ignorance both of ourselves, and of all other beings, we should neither know arts, nor sciences, nor ever experience that elevation of soul which arises from cultivating its powers, nor those sweet emotions of the heart which those only feel who are concerned for the good of others. Whereas, in the present constitution of things, the wants of children, and their total helplessness when they first draw breath, oblige their parents to take care of them out of tenderness and compassion; whilst the children, on their part, become strongly attached to their parents by reason of their wants: and from their fear of dangers, suffer themselves to be guided by them, form themselves by their example and instructions to make a good use of their reason, and acquire a sense of propriety of conduct. They thus grow up in virtue, form useful members of society, and are placed in a condition of leading a respectable and happy life.

Possessing, then, all these advantages, we may readily dispense with those which animals appear to have over us. We have no need of furs nor of feathers to cover us, nor of teeth or claws to defend us; of senses more acute than we now possess, nor of instinct to enable us to procure what is necessary for our nourishment and preservation. These gifts of nature would degrade and reduce us to a perfection merely animal. Our senses and our reason, aided by our manual exertions, are sufficient to procure us clothing, food, and every thing necessary for our nourishment and preservation, as well as comfort and pleasure; with the abundant use of all the riches so exuberant in the kingdom of nature.

It is proved, then, that those wants of which so many people complain, are the true foundations of our happiness, and the best means that Divine Wisdom and Goodness could choose to direct the faculties of man to their greatest possible advantage. Thus it is in the power of all men, by conforming themselves to the views of Omnipotence, to escape much trouble and vexation; the great mass of misery would be lessened, and we should have joyful cause to acknowledge that the sum of good is much greater than that of evil, that our afflictions are tempered by a thousand blessings, and that it is in the power of every man, by unwearied exertions, aided by virtue and integrity, to render his days felicitous, and his life useful to all within the circle of his influence.

OCTOBER XXX.

Hymn upon the Power and Providence of God.

God shall be my song. He is omnipotent; the Lord is his name; his works are great; and his government extends through all the heavens.

He wills; he speaks, and millions of worlds rise into existence: he threatens, and they are reduced to dust.

Light is his garment; his counsels are wisdom and truth. As God he reigns; truth and righteousness are the foundation of his throne.

Monarch of all the worlds, who is like unto thee? Without beginning of days, and without end of time, thou art eternal in the heavens, the incorruptible unceasing source of glory, wisdom, and felicity.

All that is, was, or ever shall be in heaven, earth, or sea, is known to God. He has contemplated his innumerable works from all eternity.

He encompasseth us; he watches over us, and under the shadow of his wings we rest in safety. None of our actions escape his penetration; he searches the inmost recesses of the heart.

He is always near us; when we lie down, and when we rise up, he is present: He knows our thoughts before we are conscious of them; if we climb up to heaven, he is there; and though we should fly with the rays of the sun to the boundaries of the universe, or fathom the depth of the ocean, there he is also.

He knows our afflictions; he heareth our prayers, and sees all that passes in our souls. All our good actions are known to him, as well as those that are bad; and when we are in danger of falling, his merciful hand upholds us.

From eternity he has planned the welfare of man; we have nothing that does not proceed from him; we are wholly his; by his goodness we live; let us therefore glorify his name, and continually sing his praises.

Who is able to comprehend and recount the grandeur and magnificence of God's creation? Every grain of dust displays his power; every blade of glass his wisdom; and the air, the sea, the hills, the valleys, and the meadows, declare his glory.

God waters the earth, and spreads a verdant carpet beneath our feet. His blessings encompass us: the day and night; the corn, and the fruit of the vine; joy and abundance all flow from him.

Not a sparrow falleth to the earth without his will; and why shall man abandon himself to vexation; and not confide in the paternal cares of his God, his protector, and constant supporter? under whose shelter and guardian power, no dangers can overcome, no terrors appal: with God for our leader, we need not fear the united powers of darkness, of oppression, and of iniquity; though tempests roar, and storms howl around us, we may in safety view the contending elements, and calmly contemplate the sublimity of nature, whilst we adore the Deity.

OCTOBER XXXI.

A Hymn of Praise.

Thou, O Lord, hast created the hosts of heaven, and the myriads of angels, which unceasingly surround thy throne. The immense extent of the heavens, with all their magnificence, is the tabernacle of those blessed spirits which love and adore thee.

Thou hast adorned this globe of earth with a thousand beauties that delight our souls. The sun which irradiates so many spheres, which fertilizes our fields, and enriches us with so many blessings, never wanders from the vast orb which thou hast prescribed to him.

At thy command, the moon's paler radiance nightly gleams in the heavens; and wherever we cast our view we perceive the effects of thy goodness, and thy blessings never cease to visit us.

Springs and fountains that ever flow, preserve for us their pure and limpid streams. The mild dew waters and refreshes our meadows. The mountains and the valleys, the fields and the groves, present us with a thousand beauties; and the whole earth, which thy hand sustains in infinite space, is full of thy riches, crowned with thy blessings, and fertilized by thy bounty.

Let us bear without murmuring the afflictions of life; they are always solaced by some moments of enjoyment, and mitigated by the cheering influence of hope. The grand spectacle of nature animates our drooping spirits; and the rays of divine grace dry up all our tears.

But who can fathom the depth of thy ways? In this life, good and evil accompany each other. Earthquakes, tempests, war, pestilence, and famine, often disturb the happiness and security of man, and death unrelenting and unsparing spreads wide his devastation.

A breath overturns us, lays us in the tomb, and reduces us to dust. But, blessed be the Almighty God, the rock of our safety, and the tabernacle of our salvation, who has opened unto us the doors of eternal life, through Christ Jesus our Lord.

NOVEMBER I.

Marine Animals.

INDEPENDENT of the great variety of plants, herbs, trees, and bushes, which grow and twine together at the bottom of the deep, there are so many different species of animals, that we cannot possibly know them all, much less can we enumerate the individuals that belong to each species.

Among this innumerable multitude of animated beings, there is no confusion; but all may be easily distinguished; and in the sea, as every where else, a perfect order reigns. All these creatures may be arranged in certain classes: each one has its particular nature, food, mode of life, distinct character, and peculiar instinct. In the sea as well as upon land, there are shades of gradation, and insensible steps from one species to another. Where one ends, the other begins. The stone which is the highest link in the mineral kingdom, is half a plant; the plant which terminates the vegetable kingdom, partly belongs to the animal kingdom; and the animal kingdom which connects man with the brute creation, has some resemblance to him. In the sea also, nature passes by just gradations from little to great, insensibly perfects the different kinds, and connects them all by one immense chain, no link of which is defective.

How prodigious is the multitude of inhabitants contained in the sea! What varieties are found amongst them! What diversity of forms, of instincts, and of destination! Some are so small as to elude our perception; others so large, that their enormous bulk inspires us with terror. Some of them are destitute of all beauty; and their colour so nearly resembles that of the sea, that it is with difficulty we can distinguish them. Others are adorned with the most brilliant and magnificent colours. Some species are very unprolific; and if it was not so, they would destroy all the rest. Others, again, multiply prodigiously, and are highly beneficial by supplying men and animals with food.

"Lord, how numerous are thy works! In wisdom hast thou made them all: the earth is full of thy goodness: the great and wide sea, wherein are things creeping innumerable, both small and great beasts, display thy marvellous riches. There go the ships; there swims the huge whale, which thou hast formed to sport amongst the waves, the terror of the finny race, to play therein. All these wait upon thee, that thou mayest give them their meat in due season."

NOVEMBER II.

The Wisdom of God in connecting the different Parts of Nature.

As all the members of our bodies taken collectively, form a whole, constructed and arranged with the utmost wisdom, so also the different varieties of natural productions may be regarded as so many members, of which Supernal Power has composed one perfect whole. A very slight attention is sufficient to convince us, that every thing in nature is connected together, and linked so firmly, as to form a perfect system. Different kinds of mineral earths nourish and support the vegetable kingdom, without which animals could not live; and fire, water, and air, are indispensibly necessary to the preservation of the terrestrial globe.

There is, then, an indissoluble bond between all the various beings, animate, as well as inanimate, which compose our globe; and philosophers have demonstrated that this globe itself has its necessary connecting links with the sun, the moon, and the whole creation. And to combine this immense multitude of different beings and substances, so as to form one complete whole, could only be effected by Omnipotent Wisdom. This alone could unite together so many millions of different creatures, and link them in such a manner, that they should be continually connected, and mutually support each other.

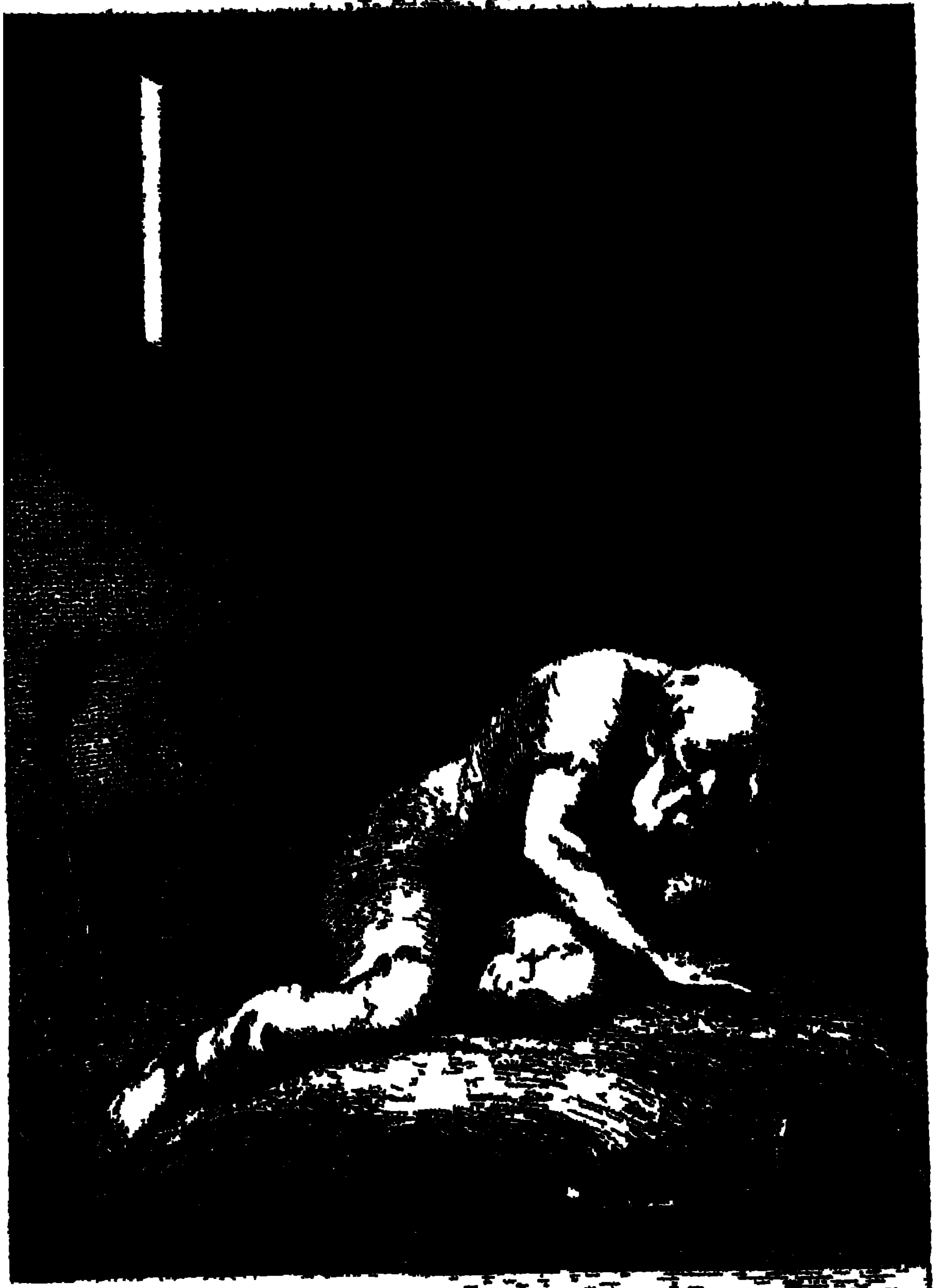
That we may not be perplexed and confounded by the immensity of the universe, let us for the present confine our attention to our globe, which is one of the most inconsiderable parts of the universe. The wisdom that we shall there discover, may lead us to form some idea of that which is manifested in the rest of the creation. Let us begin with considering what is immediately before our eyes. If we examine the animal kingdom as to the relations it bears to the rest of nature; and reflect upon the wants which are common to all animals, we shall be struck with the admirable harmony that reigns throughout. Warmth, air, water, and light, are all indispensably necessary for the preservation of these creatures; but they must be administered in a just proportion; too much or too little would be equally prejudicial, and destructive of the order of nature. A great increase of heat would be fatal to all living creatures; for if our earth, taken as a whole, received more heat from the sun, in every climate the summer must necessarily be hotter than it now is; and experience teaches us, that in all countries the heat is sometimes so great, that if it was only increased in a very small degree, either in intensity, or duration, animals would die, and vegetables be parched up. On the contrary, if we had less heat, we should not fare better, since at present the cold is sometimes so severe, that animals are often frozen to death.

The earth, then, receives from the sun that proportion of heat which is best adapted to the state of all living creatures, and any other degree of temperature might be prejudicial to them. As exact a proportion is also observed with regard to air. The rising of vapours principally depends upon the heaviness of the air, and the descent of rain upon its lightness. If the air was not capable of being condensed, and alternately rarefied, of becoming at one time heavy, at another light, we should not have that diversity of temperature so necessary to the vegetation of plants, and the life of animals. If the air was usually heavier than it is, it would be more charged with vapours, clouds, and fogs; and from its great humidity would be unwholesome, and injurious to plants and animals. If, on the contrary, it was lighter, vapours would not ascend, nor collect in form of clouds. It is the same every where: nature always observes a just medium; as all the elements are arranged in that manner which is best fitted for the preservation of animals; they are also in perfect harmony with all other natural things. The air is not only the medium in which those variations of temperature so necessary are produced; it is also the medium of sound: and has been appropriated to our ear, thus manifesting the operation of a marvellous Wisdom. For if the air had been more or less elastic, denser or more rare, than it actually is, the ear would have suffered in consequence, and the human voice, now so sweet and harmonious, would have been more like the report of thunder, or the hissing of serpents. The air also contributes to the circulation of the blood, and penetrates into the smallest vessels. There are numerous other relations between the air and different beings; and in every instance it has all the properties that each requires.

If, then, we consider that many thousand species of plants and animals have an equal want of air, heat, and light, that each of these species is different from all the rest, that each has its certain and peculiar characteristics, that it is weaker or stronger than others, and that, notwithstanding this, the elements are equally well adapted to all, and sufficient to supply so many, and such different wants; we must acknowledge that a boundless Wisdom, which yields to no difficulties, has alone established the foundation of the universal connection and wonderful harmony that reign throughout nature, and link together every bei[illegible]e firm bonds of union.

I[illegible], every thing in nature is weighed, measured; and numbered, and destined to certain purposes.

STURM'S REFLECTIONS



[illegible] prison or in [illegible] [illegible] [illegible] sighing for
[illegible] [illegible] [illegible] breeze.

Not only the trees which rise so majestically; the plants which have such beautiful forms; the fields, and the fertile meadows; the [illegible] which renders us so many faithful services; the [illegible] which feed and clothe us; the [illegible] the implements and riches; the sea which supplies our table with the choicest luxuries; and which [illegible] our way to either pole; the stars which shine upon the earth; not only all these brilliant productions of nature, but the humblest mosses, insects, and shell-fish, combine in the general sum of perfection.

Infinitely powerful Being! Creator and Preserver of all things; can I contemplate these objects without thinking of thee, and reverencing thy wisdom? Without thee all would be darkness, confusion, and disorder; without thy salutary influence, there would be no order, harmony, or pleasure in the earth. It is thy wisdom which beautifies, enriches, and preserves all; it vivifies and renders happy all the creation; and henceforth, and for ever, shall be the subject of my songs. I will unceasingly bless thee, O God, and sing hymns of praise to thy honour; for unto thee appertains all wisdom, power, and glory.

NOVEMBER III.

Reflections upon the Summer which is passed.

The fine summer days are now gone, and except the sweet remembrance of our having once enjoyed them, have only left us emblems of frailty. How all the face of nature is changed! The rays of the sun faintly pass through the gloomy clouds, and fall upon gardens stripped of flowers, upon fields where scarcely any traces of cultivation remain, and upon hills where only a few scattered herbs are seen. The soft melody of the birds no longer floats on the air, and the mournful silence which universally prevails, is only interrupted by the croaking of ravens, and the shrill cries of birds of passage which leave us while they seek more temperate climes. The neighbouring mountains are deserted; the flocks have forsaken them; the bleating of lambs is not heard; and the flower-beds in our gardens are laid waste. How dull and gloomy are the fields which lately were so beautiful! their delightful verdure is succeeded by a melancholy aspect, and their charms are withered. The clouds are heavy with rain, and thick mists veil the morning sun.

Such are the prospects which nature now presents; and who can contemplate them without thinking upon the frailty and uncertainty of all earthly things? The fine days are no more; even whilst we were anxious to enjoy them, they fled away. But have we a right to murmur at, or to question the dispensations of Providence? Certainly not. Let us rather call to mind those delightful summer days, and the innocent pleasures we then enjoyed, and we shall bless and adore the God of the seasons. What sweet sensations have we not experienced, what pure joys have visited our souls, when we contemplated the beauties of nature, when we watched the mountains and the valleys gradually become green; when the carols of the lark were heard among the clouds, and the plaintive melody of the nightingale stole upon the breeze, or poured along the groves, when we inhaled the fragrant breath of the flowers; when Aurora, rising from her rosy bed, smiled upon nature, and diffused around her joy and festivity; or when the forests and the hills glowed with the parting rays of the sun, retired beneath the western main! How rich are the presents we have received from the gardens, the fields, and the orchards; how exquisite the raptures of our imagination, and the pleasure of our senses! And can we think of the lovely months that are past, without experiencing the sweetest emotions, and blessing the great Parent of nature, who has crowned the year with his blessings?

We now live upon the gifts of summer and autumn. We have seen with what activity nature laboured in those delightful seasons, to accomplish the beneficent views of the Creator in favour of man. How many plants and flowers has not the spring caused to bud; how many fruits has not the summer ripened; and how many harvests are gathered in autumn! At present, the earth has completed her designs for this year; and is now going to enjoy a short repose.

Thus nature is continually active during the greatest part of the year, and even during the time of her apparent cessation from labour, is not entirely idle; but is secretly preparing for a new creation. Let us ask ourselves the question, have we been equally industrious? Have we so employed our time, as to produce fruits? The husbandman now counts his sheaves; and shall we not be able to reckon some virtues, some good works? Have the pleasures of summer rendered us better, and more grateful? Have we, whilst contemplating the beauties of nature, lifted our hearts towards God? What have been our occupations during the long summer days? Have they contributed to the glory of God, and the welfare of our fellow-creatures? While contemplating the sun, the flowers, and all that is interesting in nature, have we experienced such sentiments as the view of so magnificent a spectacle ought to excite? And can we testify that this summer, like many others, has not been lost upon us?

We are still blessed with life, and enjoy the power of reflecting upon the spring and the summer which are just departed; but since the first dawning of spring, ere the summer sun looked down upon the earth, how many souls have passed from these regions of day, into the dreary confines of death! It is right, O Lord, that we whom in thy merciful condescension thou yet permittest to draw the breath of life, should bless thee for our existence. But the period hastens when we shall also depart; perhaps we shall never behold the bloom of another summer: let each one of. us, then seriously reflect upon the account he will have to give when called upon, of the days which we have passed, and supplicate the God of Mercy not to enter into judgment with us.

NOVEMBER IV.

Inconvenience of the Night.

AT this season, the nights become considerably longer, and certainly this arrangement is in some respects unpleasant. Though a part of the night is allotted to strengthen and refresh us by sleep, this very operation is a proof of our weak and frail nature. At the commencement of night all our labours are interrupted, not only from the want of light, but equally as much from the necessity of reposing our wearied nature, and recruiting our exhausted strength.

It is, then, by no means extraordinary that the nights appear long and tedious, when we are restless, and sleep eludes our desires. How anxious the sick man counts the hours, and longs for the approach of morning!

Another inconvenience of night is, that we are liable to lose our way, and encounter fatal disasters. When the sun has withdrawn his light, and night has spread her mantle over the earth; the traveller wanders uncertain of his way, and, unable to trace the path, falls among briars and thorns, bogs, and quagmires: or stepping over the precipice, is plunged into the gulf below. In the night time we are also exposed to the attacks of the villain, and the depredations of the plunderer, either abroad, or when we are retired to rest; for darkness conceals the steel of the murderer, and veils the deeds of iniquity. Another inconvenience of night is, the cold that then generally prevails; and by their regular return, we are constantly presented with an emblem of death.

There is neither continual day nor night upon the earth; and though the hours of darkness are so many during the winter, that even during the summer the return of darkness constantly divides the day, it is yet certain that God has favoured our globe with more light than darkness, an advantage which is still more increased by the twilight, as well as the light of the moon and stars. Blessed, then, be the Lord, for the light of the moon and of the stars; for the rays of the sun, and the splendour of the noon-day! And more especially may his name be blessed for the glorious light which his Gospel has diffused through the deep night of ignorance, of error, and of misery Pure rays have descended from heaven to illuminate the gloom in which we were involved; and let us ever remember in our darkest nights, in our moments of sorrow and adversity, that we are hastening on towards the regions of light and joy. Should it at any time happen, that in the midst of midnight darkness, sleep forsakes us, and disease or afflictions cause us to number the melancholy hours, let us console ourselves with the reflection, that we are not plunged in the hopeless certainty of an eternal night; but that we are advancing towards the heavenly kingdom, the happy region, where night will not exist, where darkness will cease to alternate with light, and where will be no sickness, distress, or sorrow.

Blessed be the Almighty, that the night of ignorance and misery which envelopes us in gloom, is not eternal: Heaven and endless glory shall be the portion of the righteous. Hasten on, thou sun, and ye radiant stars that blaze in the firmament, hasten to finish the course which is prescribed to you; that the time of trial, the revolutions of day and of night, the months, and the years which are allotted me, may be speedily terminated. Enable me, thou light of faith, to hail the dawn of that glorious day when the season of night and the darkness which now encompass me shall vanish for ever! Blessed morning of eternity, hasten to open thy bright portals, and crown my anxious hopes! My soul longs to wings its flight to those happy abodes of the righteous, to that fair city which endureth for ever, where eternal day reigns, and no night, no weariness, retards the progress to all perfection, knowledge, and felicity.

NOVEMBER V.

Woods and Forests.

THE surface of the earth presents not to the eye a more beautiful picture, than that of woods and extensive forests; and an enlightened observer, who calls every thing excellent that is good and useful, finds in them much that is worthy of his attention. Let us, then, visit these woodland scenes, which will supply us with so many sources of admiration and gratitude.

While our walks in the fields and meadows are less agreeable than they were in the late fine season, the forests will be more interesting, and productive of real pleasure. There is no place more proper to dispose our minds to reflect upon the grandeur and beauty of the works of nature, than a lonely wood; the solitude of the place, and the profound silence which reigns there, dispose the mind to look back upon itself, and awaken the powers of the imagination.

At first the number and variety of the trees attract our attention. What distinguishes them from each other is not so much their height as the difference that is observable in their manner of growing, in their leaves, and in their wood. The resinous pine is not remarkable for the beauty of its leaves, which are narrow and pointed, but like those of the fir tree, they last long, and their verdure during the winter is very pleasing. The foliage of the lime tree, the ash, and the beach, is much more beautiful and diversified; their verdure is admirable, it cheers and refreshes the sight; and the broad dentated leaves of some of these trees are beautifully contrasted with the narrower and more fibrous leaves of others. We are yet but imperfectly acquainted with their seed, fecundation, and the different properties of their fruits. How many uses are made of the wood of trees! The oak, whose growth is very slow, and whose leaves do not appear, till those of most other trees are in bloom, supplies us with a very hard and durable sort of wood, which art knows how to employ in a great variety of works, which are so lasting, as in some instances to brave the ravages of time. The lighter kinds of wood serve for other purposes; and as they are the most abundant, and grow quicker than any other, they are of more general utility.

It is to forest trees that we are indebted for great part of our houses, and our ships, for fuel, and for various implements, furniture, and utensils. The industry of man leads him to polish, turn, and carve wood into a variety of works not less elegant than useful.

The Divine Wisdom has distributed forests over the earth with more or less abundance. In some countries they are very distant from each other; in others they occupy many leagues, and rise majestically into the air. The want of wood in some countries is compensated by its abundance in others; and neither the continual use that men make of it, the destruction of it by accidental conflagrations, nor the great quantities consumed in severe winters, have been able to exhaust this rich gift of nature. In the lapse of twenty years we may see a forest where we before only saw some low copse, or a few scattered trees.

All this ought to convince us of the power and goodness of our heavenly Father, whose wisdom is so superior to that of mortals; and who has foreseen the necessities of men in all possible circumstances. In those countries where the cold is most severe, or where wood is chiefly wanted for the purposes of navigation, the most extensive forests grow; and from their unequal distribution a very lucrative source of commerce is derived, forming a new bond of connexion amongst men. We all participate in the numerous advantages which woods afford; and in creating forests, God has provided for the good of each individual. Blessed be our heavenly Father, who has mercifully vouchsafed to interest himself on our behalf, before we even felt our wants, or could represent them to him! In every thing he has anticipated our desires, and may we each individually endeavour, by fulfilling the great ends of our creation, to pay the tribute of gratitude, of love, and of praise, so justly due to the God of all goodness!

It has not been entrusted to the care of man to plant and maintain forests; God has reserved this labour to himself; he plants, and preserves the trees, while man has little share in their cultivation. They grow and multiply independently of our cares; they continually repair their losses by new shoots; and are always sufficiently abundant to supply our necessities. To be convinced of this we need only consider the seeds of the lime tree, the maple, and the elm; from these small seeds vast trunks proceed, whose leafy tops rise into the clouds. It is the Almighty God who alone has established them, and who supports them for ages against the efforts of winds and the shocks of tempests. It is he who sends the dew and rain yearly to recruit their verdure, and preserve their youth.

The earth which bears the forests does not create them, neither, to speak correctly, does it nourish them. The verdure, the seeds, and the blossoms of trees, which they yearly lose, and yearly renew, and [illegible] sap which is continually dissipated, are losses which would at length exhaust the earth, if it alone supplied them. Of itself, it is a heavy, dry and barren mass, which draws from other sources the juices and nourishment which it conveys to trees and plants. The principles of their growth do not proceed from the earth; the air furnishes in abundance water, salt, oil, heat, and all other matter which trees require.

Let us, thus favoured with so many blessings, contemplate that Being who is the Author of all our good. The forests and the woods are the heralds of his bounty, and we should be guilty of the basest ingratitude, if we did not acknowledge this benefit which we witness daily in our houses, and in our gardens, or wherever we direct our view.

NOVEMBER VI.

The Sense of Feeling in Animals.

FEELING may be justly regarded as the universal sense of animals, and the foundation of all other sensations. For seeing, hearing, smelling, and tasting, cannot take place without an impression being made. As the sense of feeling operates differently in seeing, from what it does in hearing, and in hearing from what it does in the other organs of sensation, we may with propriety distinguish the sense of touch properly so called, from that universal sensation which we have just mentioned. They are both produced through the medium of the nerves. These, of which anatomists enumerate ten principal pair, resemble small cords or filaments united together, derive their origin from the brain, and are distributed to every part of the body. Wherever there are nerves there may be sensations; and wherever is the seat of any particular sense, there will also be found nerves that are the general organs of that sensation. There are optic nerves, and auditory nerves; olfactory nerves, and gustatory nerves; as well as nerves subservient to the sense of feeling, that like it are distributed to every part of the body. These nerves proceed from the brain; whilst others pass off from the spinal marrow, through the lateral openings of the vertebræ, and are then distributed to every part by innumerable ramifications. The nerves subservient to the general sense of feeling are also found in the organs of all the other senses, because, independently of their own particular sensations, each of these organs must be susceptible of feeling. Hence the eyes, ears, nose, and mouth, receive impressions that altogether depend upon feeling, and are not produced by the nerves proper to these organs.

That sensation is produced through the medium of the nerves is certain, for each part feels more acutely in proportion as its number of nerves is greater; and there is no feeling in those parts where the nerves are destroyed, or where no nerves exist. Incisions may be made in the fat, bones may be amputated, nails pared, and hairs cut, without any pain being inflicted; or if any is supposed to be felt, it is merely the effect of the imagination. The bones are enveloped in a nervous membrane, and the nails are attached to a part where many nerves intersect each other, forming what is called a plexus of nerves; and pain is only felt when some of these are wounded or irritated. So that when we feel the pain commonly called tooth-ach, the tooth being a bone, is not susceptible of feeling, but the nerve attached to it is extremely sensible, and occasions us to feel the most acute pain when it is irritated.

In thus diffusing the sense of feeling over the whole body, the Creator has evidently had our well-being in view. The other senses are situated in those parts, where they can most conveniently perform their functions. And as it was necessary for the preservation and welfare of the whole body that each of its parts should be informed of what mightbe useful or prejudicial, agreeable or disagreeable, it was necessary that the sense of feeling should be diffused over every part of the body. It is a still further proof of Divine Wisdom, that several species of animals have the sense of feeling more acute than falls to the lot of men; for their acuteness of feeling is necessary in their mode of life, and compensates their deprivation of some other senses. The horns of the snail, for example, possess an exquisite sense of feeling and the least obstacle causes them to be drawn in with extreme celerity. How delicate also is the feeling of the spider, since, in the midst of the web which it has so ingeniously woven, it perceives the slightest vibrations which the approach of an insect may occasion! Without dwelling, however, upon the sense of feeling in animals, it is sufficient to consider it in man, for our admiration to be abundantly called forth. How can the nerves, which seem to be merely susceptible of more or less length, breadth, tension, and vibration, transmit to the soul so many different impressions and sensations? Is there between the soul and the body such a connexion, that nerves of a determinate size, structure, and tension, shall always produce certain sensations? Has each organ of sense, nerves so constituted, so analogous to the small particles of matter which emanate from bodies, that the impressions they receive from them, should be always followed by certain determinate sensations? To these questions it may be answered, that our knowledge upon the subject is too limited to ascertain the immediate cause of these effects, and we are obliged with all humility to acknowledge that the mystery is at present impenetrable.

Let us, then, be content; and give thanks unto God, that with the other senses which he has bestowed upon us, he has also granted us that of feeling. If our bodies possessed less sensibility, of how many pleasures should we not be deprived! We could neither have discerned what would be advantageous to us, nor what would have been prejudicial Happy would it be if we had as exquisite a sense of what is good for our souls; if we rightly appreciated what is excellent and honest; if our desire for holiness equalled our love of pleasure.

NOVEMBER VII.

Remembrance of the Blessings which we enjoyed in Spring and Summer.

LET us assemble together, and acknowledge the goodness of our God. Let us gratefully remember the moments that have sweetly glided away, while we reposed on the bosom of joy, and, free from care and inquietude, suffered our hearts to expand with delight at the renewal of nature; when devotion accompanied us to the verdant bower, and every tinge of melancholy was effaced from our abodes; and while we walked along the flowery paths, every where beholding the joyful traces of the Deity.

When from the thick bush whose leafy shade had attracted the aerial songsters, burst upon our ears melody more ravishing than the sounds of the sweetest flute, and produced those exquisite sensations which fill the heart with delight, and dispose the mind to enjoy the pleasures of friendship, harmony, and peace. Smiling nature lavished upon us her sweets, and we inhaled the fragrant breath of the rose; whilst the pink and hyacinth diffused their odours far round; and the zephyrs gently playing upon the yielding flowers before night had closed their charms, wafted over us the scented gale. Then pure delight and soft emotions glowed in our hearts, our souls confessed the sweet transport, and our lips singing in unison with the warbling of the birds, attuned the praise of the eternal God.

Often when cold breezes had refreshed the burning summer air, and the birds began to be animated with new life and vigour, when the clouds dispersing had left the deep azure of heaven clear, and the sun promised a continuance of his unobscured splendour; pleasure lent us wings, and in sportive mood we quitted the noise and tumult of the town, to rove in the green fields, or repose in the shady bower. There no trouble assailed us, wisdom, piety, joy, and innocence attended us, whilst in some sequestered retreat we indulged the love of nature. The leaves, gently breathed upon by the evening gale, while they formed around us a pleasing shade, diffused a refreshing coolness; and nature there drew from the richest springs, that contentment which she bestows only upon the pure heart. There, our bosoms filled with the sweetest emotions of our own happiness, and love of our Creator, throbbed with joy, till the ready tear started from our eyes.

The gay songs from the groves poured through our hearts pleasure and gratitude. The joyful bleating of the flocks in the fat pastures, the wild note of the shepherd's pipe, and the buzzing of the beetle as it fluttered among the flowers, all impressed our souls with joy, and elevated our thoughts to the Creator; whose wisdom was thus displayed in the waters, in the air, in the cattle, the insects, and the flowers. The country all cheerful and gay, like the happy abode of our first parents, presented itself before us. Skirting the distant horizon, we perceived the dark shade of ancient forests; and hills gilded by the rays of the sun. The beautiful mixture of the most diversified colours; rural flowers; golden harvests; the rich verdure of the carpet wrought by the hands of nature; the treasures of the meadows; the sweet food of the grazing herds, that yielded us their wholesome milk; the bread of man yet green in the ear; were all objects sufficient to call forth the praises and the gratitude of a feeling heart.

There nature displayed before our ravished senses the majesty and the beauty of her eternal Author; and we then said, this magnificent universe is too beautiful, too grand to be the abode of men who can regard it without emotion. For man, the wings of the wind waft their refreshing breezes; for him the rivulets pour along their murmuring streams, while at noontide he rests from his labours, and seeks the cool retreat; for him the corn sprouts, and the trees bring forth their fruits; all the creation serves him, and he regards it not.

Yet those who love the Lord, will discover in the breeze, and in the brook, in the fields and in the flowers, in the blade of grass and in the ear of corn, traces of his eternal sapience; and proofs of his unutterable love and power. The vast creation is the sanctuary of God; the world is a temple consecrated to his glory; and man was designed to be as the priest of nature, and not the oppressive, destructive tyrant of defenceless beings.

NOVEMBER VIII.

Foreign Animals.

EVERY portion of the earth has animals peculiar to itself; and the Creator has placed them in one country in preference to another, for the wisest reasons. The elephant and the camel are the most remarkable animals of the southern countries. They surpass all others in size; the elephant, particularly, is like a living mountain, and his legs are like pillars. His head is fixed upon a very short neck, and armed with two weapons of defence, with which he is able to tear the trees up by the roots. With a longer neck he could not have supported the weight of his head, nor have kept it in an elevated position; to make up for this he has a very long trunk, which he uses as a hand to reach food to his mouth without being obliged to stoop [illegible] it. He can not only move, bend, and turn his trunk in all directions to perform what we do with our fingers, but he also uses it as an organ of sensation. His eyes are small in proportion to the size of his body; but they are brilliant, full of fire, and very expressive. In a state of nature the elephant, though wild, is neither sanguinary nor ferocious; his disposition is gentle, and he only uses his natural weapons in self-defence. Unless he is provoked, he does no one any harm; but when irritated and roused by ill treatment, he is terrible; he seizes his enemy with his trunk, shakes him in the air, and puts him out of existence, by trampling him under his feet. He eats a hundred pounds of grass in a day, and his body being of such an enormous weight, he bruises and destroys much more with his feet than he consumes for food. His principal enemy, and often his conqueror, is the rhinoceros, an animal which somewhat resembles the wild boar, and uses the horn upon his nose to pierce the belly of the elephant.

A very little attention will be sufficient to enable us to discover the wisdom of God in the formation of the elephant: he has produced it in a country abounding in grass, and has prevented its being burthensome to the earth by multiplying too fast; for the female is with young two years, and does not couple with the male till three years after.

The camel is one of the most useful animals of the east; it is admirably formed to support the severest fatigues in the midst of dry deserts and burning sands; is able sometimes to remain four or five days without drinking, and requires but little food in proportion to its bulk. It crops the few plants and shrubs that grow in the deserts, and when none of these are to be found, a small quantity of beans and barley will suffice it for a whole day. Besides the hump upon his back, its make is altogether singular; it has two gullets, one of which terminates in the stomach, the other in a sort of bag, that serves as a reservoir for water, which remains in it without becoming putrid; and when the animal is thirsty, and has occasion to moisten its dry food, it throws up into its mouth a portion of the water, which having performed its office, returns with the food into the stomach. The ordinary load of a camel, is from seven to eight hundred pounds; with this weight they will travel several miles in an hour, and continue for twelve or fifteen hours at a stretch.

Amongst the quadrupeds of the northern regions, the most remarkable are the elk, the sable, and the rein-deer. The first of these animals is large, strong, and well-shaped. Its head in form, size, and colour, nearly resembles that of the mule. Its legs are long, and of great strength; its skin is of a light grey hue. This animal is timid, stupid, and simple. He finds proper food every where, but selects, if possible, the bark and young shoots of the willow and the birch. He is extremely agile; and with his long legs can make much way in a short time.

The sable wanders in the forests of Siberia, and is much prized for its beautiful fur. The chase of this animal is generally the occupation of those unfortunate wretches who are exiled to the deserts.

The rein-deer is an animal of a beautiful and elegant form, nearly resembling the stag. It provides its own food, which consists of moss, grass, the leaves and buds of trees. The inhabitants of the north derive great advantages from it; they eat its flesh, drink its milk; and yoking it to a sledge, are drawn over the ice and the snow with wonderful speed. All the wealth of the Laplanders consists in their rein-deers, whose skins furnish them with clothes, beds, and tents; and, in fact, they derive from this animal all the necessaries of life.

[illegible]ow vast and extensive is the empire of God, who [illegible]med all species of creatures, and adapted them [illegible] region of nature, that they may contribute [illegible] of his people in all parts of the globe! [illegible] it. He [illegible] name for ever and ever.

NOVEMBER IX.

Diversity of Winds.

THE variation of the winds is considerable. In some places they are constant during the whole year, always blowing in the same direction; in others they change at certain periods, and observe certain and regular laws. In the open sea, between the tropics, and for some degrees beyond them, an easterly wind continues all the year round without any considerable variation. To the north of the line, the wind blows towards the north-east; and to the south of the line, it blows towards the south-east, and that more or less according to the position of the sun. This, however, only strictly holds in the open sea; for when islands and great continents obstruct the progress of this wind, they may change its course, and in certain places make it take a north-east direction. In the southern parts of the ocean a westerly wind generally prevails. The nearer we approach the coasts, the more variable is the wind, and it is still more so as we advance further inland.

The constant east wind is chiefly caused by the heat which the sun communicates to our atmosphere. In the Indian sea, there are winds named trading winds, or monsoons, which continue to blow in the same direction from three to six months of the year, and during a similar space of time blow in the opposite direction. The causes operating to produce these, are scarcely yet satisfactorily explained; but it cannot be doubted that the alternations of heat and cold, the position of the sun, the nature of the soil, the inflammation of meteors, the condensation of vapours into rain, and other similar phenomena, have great effect in their production. There are certain seas and countries which have winds and calms peculiar to them. In Egypt and the Persian gulph, during the summer, a burning wind, which stops respiration and consumes every thing, very frequently prevails. At the Cape of Good Hope, a cloud is sometimes seen to form, which the inhabitants term the fatal cloud, or ox-eye: at first it is very small, but soon visibly increases, and a furious tempest proceeds from it, which oversets ships, and precipitates them to the bottom of the sea.

Uncertain and variable winds, which have no determinate direction or duration, prevail over the greatest part of the globe; for though certain winds may blow more frequently in one place than in another, they do not return at fixed intervals, but begin and end without any regularity; and vary in proportion as different causes interrupt the equilibrium of the air. Heat and cold, rain and fine weather, mountains, straits, capes, and promontories, may contribute in a considerable degree to impede their course, and change their direction. No doubt many other causes which are unknown to us, influence the different modifications and agitations of the air.

What is particularly remarkable, and daily occurs in almost every place, is, that a little before sun-rise, the air is perfectly still and calm, when in a few moments after, just at the break of the morning, a pretty brisk east wind begins to rise at the approach of the sun, and continues sometime after he is risen. This undoubtedly proceeds from the air heated by the rays of the rising sun becoming rarefied, and by its consequent expansion displacing the contiguous air; and then producing an east wind, which ceases as the surrounding air also becomes heated. For similar reasons an east wind ought always to precede the sun in the torrid zone, and blow much stronger than in this country, because the sun's power here is much less than in the regions bordering upon the line. The wind, then, in th[illegible]rid zone constantly blows from east to west, whilst a west wind very rarely prevails in those parts.

From these observations, we learn that winds are not the effects of chance, without either cause or design. In these, as in every thing else, the Creator manifests his wisdom and goodness; and he has so arranged them, that they are continually rising, and a dead calm very seldom happens. He regulates the motion, power, and duration of the winds, and prescribes to them the course they ought to take. Their very diversity is of use; for when a long drought has made plants and animals languish and droop, a wind proceeds from the sea-coast, loaded with exhalations, waters the meadows, and gives new animation to nature. When this object is accomplished, a dry wind coming from the east restores the serenity of the air, and brings back fine weather. The north wind brings along with it numerous frozen particles, and purifies the autumnal air from its noxious vapours. Lastly, to the sharp north wind succeeds the south wind, and coming from the southern regions, it diffuses a grateful warmth through the air. Thus, these continual variations of the winds tend to preserve health and fertility in the earth.

Who can make such reflections as these, and not adore God, in whose hand are all the elements, and whose words either bids them rage, or calms their strife? At his command, the storms and tempests roar, and bursting from the ocean's depths, rush to earth's utmost boundary; when again, at his word all is still, and hushed as on an autumnal evening, when not a breeze plays on the surface of the deep.

NOVEMBER X.

The Chase.

At this season of the year, the chase forms a very principal amusement with a certain class of men; and there is much reason to regret that so much importance is attached to it. For the dominion which man has over animals, and the pleasure which he takes in subduing them, is too frequently mingled with cruelty. It is true, that sometimes the death of animals is necessary to enable us to make that use of them, for which they are designed, or when their too great increase might render them troublesome or hurtful to us. But even then, it behoves us to render their death as mild and easy as possible; yet, unfortunately, this is very little regarded by the generality of people; and men in this respect show themselves to be more sanguinary than the most ferocious beasts. How revolting from every feeling of humanity, and the dignity of rational beings, is the practice of hare and stag-hunting! Can that be called an innocent pleasure, or a manly exercise, that instigates us to pursue with implacable fury a poor defenceless animal, which flies before us in the utmost agonies of fear and suspense, till worn out with fatigue it falls a helpless victim, whilst its groans and dying convulsions are hailed by the joyful shouts of the huntsmen. And is there a human breast that does not bleed at such a picture; or in human shape a monster who can behold such a sight without emotion? To purchase pleasure by the death of an innocent, inoffensive creature, and that death embittered by the most cruel torments, is a dear sacrifice of our feelings: and surely that pleasure which familiarizes us with scenes of cruelty and barbarity, is dangerous, and destructive of virtue; for it is impossible for the heart of that man to be good, and possessed of noble and generous feelings, who can bear with satisfaction the expiring groans of these animals; and it is equally impossible for him to be passionately fond of the chase, and center in it a great share of his happiness, without gradually becoming indifferent to the calls of humanity, and deaf to the voice of nature. A man of this description is in great danger of becoming cruel and sanguinary; he will soon only derive pleasure from scenes of misery and destruction; and being accustomed not to feel for the sufferings of animals, in time he becomes equally regardless of his fellow creatures. Hunting, then, will be considered men of morality and religion as an occupation irreconcileable with the great duties we are called upon to fulfil; and those who are truly wise, and wish to be useful members of society, will seek more pure and innocent pleasures; and such certainly may be found.

We possess within ourselves the most abundant sources of pleasure; a mind and faculties, the cultivation of which is continually productive of the purest and most unalloyed delight; and in this the great science of the Christian and of the Philosopher consists; and those who pursue it with perseverance acquire the art of being happy without sacrificing their virtue, or destroying their feelings; on the contrary, by the continued improvement of their mind, and suffering religion to keep pace with knowledge, they attain that happy state which the world can neither give nor take away. To diversify their pleasures they have only to walk forth into the garden of nature, contemplate the grand and beautiful objects there displayed, or mingling in the cheerful society of men like themselves in the search of truth, enjoy that delightful converse which is unknown to the sensualist, the ignorant, or the vicious.

NOVEMBER XI.

Dreams.

During the state of sleep, the faculties of the mind are not entirely at rest. The imagination is often active, and ideas and images are present before us. Such is the case in dreams. However, the soul seems to have little share in them, except so far as relates to the memory. If we reflect upon our dreams, and examine why they are so unconnected and irregular, why the events represented to us are improbable, it will be found to proceed from our being more affected by sensations than perceptions. In our dreams we often seem to behold persons whom we have never seen before, or who are long since dead; we see them as if alive, and associate with them things that actually exist. If the soul acted as vigorously in dreams as when we are awake, a moment would suffice to collect and arrange our scattered and confused ideas. But its attention is usually confined to receive and follow the representations which are presented to it. And though objects often present themselves very forcibly, they are almost always strangely associated, without any regular connection. Sensations succeed each other without the soul combining or arranging them. We have, then, only sensations, and not notions; for notions can only take place when the soul compares sensations, and operates upon the ideas which it has received through the medium of the senses.

It is singular that in dreams we never imagine that we hear, but only that we see; and it is still more remarkable that the images which we see, often bear a most exact resemblance to their originals. Beautiful landscapes, which we have never attentively observed, are presented to us in dreams, more exactly delineated than if drawn by the most eminent artists.

As to the accidental causes of dreams, by which former sensations are renewed without the operation of any present and real impression; it must be observed, that in a state of profound sleep we never dream; we are conscious of no sensation, and our organs of sense are not acted upon by external objects. That sense which first yields to the influence of sleep, is also the first that awakes, being the most lively and active, and more easily excited than the external senses. When sleep is more imperfect, and less sound, dreams generally occur. Former sensations are renewed; the internal sense, which by the inactivity of the external senses, cannot employ itself upon present impressions, exercises itself on preceding sensations; and of these generally prefers such as have most forcibly affected it; hence it is, that dreams are either very frightful or extremely agreeable.

Another circumstance in dreams worthy of attention is, that they are often characteristic of the nature of the individual. From the phantoms which haunt his imagination during the night, we may form some conclusion whether he is virtuous or vicious. A cruel-minded man continues to be so even in sleep, while the man of benevolence preserves in his dreams the same mild feature of character. It is, nevertheless, true, that an impure and vicious dream may be occasioned by the state of the body, or by external and adventitious circumstances. But our conduct when first awake, will show whether or not such dreams ought to be imputed to us; we have only to observe, what opinion we form of them at the time. The good man is not indifferent with respect to his dreams; and if, during his sleep, his mind has wandered from what is strictly just and virtuous, he is afflicted by it when he awakes. It generally happens that the mind that reposes with a conviction of the favour of God, has, during a state of dreaming, ideas and representations of heavenly things. A good conscience often consoles a righteous man in his sleep, with the impression of his merits being rewarded by divine favour and approbation.

Sleep, however, is not the only time when wild and unconnected objects produce a confusion of ideas. How many people dream while awake! Some form high opinions of their own importance and dignity, because the favour of a prince, or wealth, has raised them to some degree of rank. Others place their happiness upon empty fame, and feed their imaginations with the vain hope of immortal honor. Such beings as these, in the delirium of their passions, and in the intoxication of their self-love, may fancy that they are happy, and endeavour to make others believe it; but all such frivolous and deceitful felicity vanishes as a morning dream. They have been well described by an eminent prophet, when he said, "They resemble an hungry man who dreameth that he eats; but he awaketh, and his soul is empty; or as when a thirsty man dreameth, and, behold, he drinketh; but he awaketh, and behold, he is faint, and his soul hath appetite."

Let us, then, never seek our happiness in vain phantoms, and delusive dreams, but henceforth aspire to obtain, through Divine Assistance, that wisdom which perisheth not, and that glory whose radiance endureth for ever, and which when in the last awful moments of our existence, we take a retrospect of our past life, will not add the sting of remorse to the painful separation of the soul from the body, nor cause the tears of hopeless repentance to increase the woe of our afflicted friends!

NOVEMBER XII.

Every Thing in the Universe is connected together, and concurs to the Preservation and Perfection of the Whole.

Every thing which the beneficent Creator has produced upon the earth, is admirably connected together, and contributes to the mutual preservation of the whole. The earth itself, the rocks, the minerals, and the fossils, all owe to the elements their origin and support. The trees, plants, herbs, mosses, and all kinds of vegetables, derive their subsistence from the earth; while animals in their turn live upon the vegetable kingdom. All these, afterwards, return to their first principles. The earth supplies the plant with its nutriment; the plant the insect; the insect the bird; the bird the wild beasts; and in their turn the wild beasts become food for the vulture; the vulture to the insect; the insect nourishes the plant, and the plant the earth. Man himself, who converts all these beings to his own use, often in turn becomes their prey. Such is the circle in which every created thing revolves.

Thus, all creatures have been created for each other; and no one solely for itself. The tiger, the lynx, the bear, the ermine, the fox, and various other animals, yield us furs for our covering. The hounds pursue the fleet hare, and hunt down the stag in the forests to supply our tables; while the portion they themselves receive of the prey is very small. The ferrets drive the rabbits from their deepest recesses into our hands. The horse, the elephant, and the camel are trained to carry loads, and the ox to yoke to the plough. The cow gives us her milk; the sheep her wool; the rein-deer draws the sledge with velocity over the snow and ice; the swine, the hedge hog, and the mole, burrow in the earth and turn it up, that the seeds of plants may be more easily propagated. The hawk is subservient to the pleasures of the chase, and the hen gives us eggs. The cock's shrill cries awaken us in the morning, and the carols of the lark delight us in the day. The morning and evening are hailed by the melody of the blackbird, and the night is sacred to the varied notes of the nightingale.

The brilliant plumage of the peacock delights the lovers of gaiety. Fish from the depths of the ocean, swarm upon our coasts, and enter our rivers in shoals, and supply an abundance of nourishment to men, birds, and beasts. The silk-worm spins, that we may be clothed with its precious web; and the bees for our use collect their sweets from every flower that scents the air. The sea casts upon our coasts multitudes of crabs, oysters, and various kinds of shell-fish, for the use of men and animals. The lantern-bearer, or great fly of Surinam, shines during the night, and gives light to the inhabitants of that country.

If we also examine the different occupations and labours of men, we shall find that they equally tend to the same end which nature has proposed. The mariner tempts the dangers of the sea, and braves the storm, to bring to his country merchandise which does not belong to him. The soldier sheds his blood in the service of his country, and to preserve the well-being of his fellow-citizens. The lawyer is occupied in the affairs of others; and sovereigns and magistrates, who sit at the helm of government, devote their time and their faculties, in steering it for the good of the commonwealth. Parents amass treasures for their children. The husbandman sows and reaps seed, a very small part of which falls to his lot to consume. Thus, we do not live for ourselves alone; and the wise Author of nature has so ordered, in his infinite mercy, that all beings shall be useful to one another.

From this let us learn what are our moral duties. He who has power should succour the feeble. The man of learning should help with his advice those who are deficient; and impart his wisdom to the ignorant. In fine, we should love our neighbour as ourselves; and by so doing, we should the most effectually fulfil the designs of our Creator The reciprocal duties which men owe to one another, have induced them to form societies; for that which individual power could not effect, is readily accomplished by united energy. No person could erect a stately edifice, or construct a palace, if he was obliged by himself to lay the foundation, dig the cellars, mould the clay and bake the bricks, raise the walls, cover in the roof, make the windows, decorate the apartments, &c. But all this is easily performed, when several artificers unite and mutually assist each other. Such is the constant law of nature, that in all the arts and sciences, nothing beautiful or excellent can be effected, without the concurrence of several persons. How many thousands of men are requisite to make a monarch powerful, and a nation renowned and prosperous!

In all this we have abundant cause to acknowledge the wisdom of our Creator, who, that all the inhabitants of the earth, and particularly man, might be happy, has established such relations and connections amongst all beings, that one cannot subsist without the others. Experience daily teaches us, that God has ever in view the welfare of his creatures: for this purpose the whole world was planned, and so arranged, that all its parts concur to promote the general happiness of mankind. Even those things which we consider as the least important, and to which we scarcely condescend to turn our attention, contribute to our felicity. The very insects, which appear so despicable and insignificant, are highly useful to us. Thousands of hands are daily employed in satisfying our wants; and thousands of animals perish to support our lives. And in how many other ways, of which we are ignorant, is not nature active in our favour!

Merciful and indulgent Father! teach us how to appreciate thy goodness, and estimate our felicity; cause to arise in our hearts, the desire of doing in future all that our limited faculties and strength will admit of, to promote the cause of righteousness amongst men, and to imitate thy goodness to us by assisting, according to our several abilities, these who are in need.

NOVEMBER XIII.

Common Salt.

Salt forms the seasoning which is most extensively used, being common to the rich and the poor, the king and the beggar. Its savour is so grateful, and it possesses such excellent properties for digestion, that we may regard it as one of the most precious gifts which nature has bestowed upon man. We procure it in different ways. The inhabitants of the coasts obtain it from the sea. They dig pits on the shore, which they call salt-pits, and plaster them with clay; at a full tide the sea flows into them; and the water which it leaves, soon evaporates by the heat of the sun, and there remains at the bottom of the pits abundant of salt. In other places nature furnishes salt-springs, fountains, and lakes; and to obtain salt from these the water is evaporated in large cauldrons. In some places again, salt is found in solid masses in the mountains; the most celebrated mines are those of Catalonia and Poland. All these different kinds of salts are alike in their chief properties. Experience teaches us that a certain proportion of salt dissolved in the stomach has a digestive power, and prevents the putrefaction and too great fermentation of the alimentary matter. Hence, it is used internally to assist and restore digestion; to remedy crudities in the stomach; to excite the appetite; and to stimulate the stomach, whose nerves it gently irritates, and favors all its operations. Common salt, then, may be regarded as one of the best digestives in nature; other salts act too powerfully, and are too disagreeable to the palate to be mixed with our food.

Salt is therefore a particular blessing, though perhaps it is less esteemed because of its universality. But were we in the practice of paying more attention to the blessings which we daily receive from God, we should have infinitely more cause to acknowledge and admire his goodness. Salt, besides the uses which we have enumerated, is interesting to the observer of nature, from its external appearance; the least particles of it seeming as if they were cut into eight angles, and six sides like a die; hence, such masses are of a cubical form. And here again we have an evidence of a Supreme Being, who has given to the salt an invariable form, and has shaped the different masses in the same model from the beginning of the creation; thereby proving that its origin is not owing to chance, or fortuitous circumstances, but to the will of an Intelligent Being. And this thought is too important, and too essential to our present and eternal peace, to be disregarded; or not to be impressed upon our minds so deeply as never to be effected.

NOVEMBER XIV.

Origin of Fountains.

All great rivers are formed by the streams of smaller ones uniting, and these take their rise from brooks which fall into them; and the brooks derive their origin from springs and fountains. Of this there can be no doubt; but whence do springs proceed? Since water, by its gravity, as well as fluidity, always occupies the lowest parts of the earth's surface, whence can the water come which flows so constantly from the most elevated regions?

It is ascertained, in the first place, that rain, snow, and generally all the exhalations which fall from the air, supply a great portion of the water that flows from springs. Hence it is, that fountains and rivers are so rare in Arabia Deserta, and in certain parts of Africa, where it never rains. The waters, then, insinuate themselves into the earth, where they penetrate till they are obstructed by beds of clay, through which they cannot pass; and thus accumulating, form fountains: or they collect in cavities, which afterwards overflow; or the waters gradually rill through innumerable crevices, to the lowest places to which they can descend. Thus, the water is continually flowing, and forms subterranean currents, which uniting with more of the same description, make what is called a vein of water.

It is, however, very probable, that in some countries, fountains do not owe their origin solely to the waters which descend from the atmosphere; for considerable springs and lakes are sometimes found on high mountains, which would seem not to be altogether produced by either rain or snow. There are many springs that in all seasons yield the same quantity of water, and even sometimes supply more during a time of great heat and long-continued drought, than in moist and rainy weather. There must, then, be some other cause contributing to the formation and continuance of fountains.

Many springs are formed by vapours, which being suspended in the atmosphere, are driven by currents of air towards mountains and elevated places; or by the power of attraction, are drawn towards these great masses. The atmosphere is more or less loaded with aqueous exhalations, which being driven and pressed against hard and cold rocks, are condensed in drops, and thus increase the springs. We must however, admit that all springs cannot derive their sources from this cause; for if this was the cause, would not the Rhine, the Danube, and other rivers which flow from high mountains, be dried up in winter, when these enormous masses are covered with ice and snow? Caverns which communicate with the sea, or with lakes, must contribute to the origin of fountains. The water of the sea having passed into these great cavities by subterranean canals, rises in vapours through a number of crevices, and forms drops, which falling by their own gravity, sometimes take a contrary direction, because water cannot always make its way where vapours penetrate. Lastly it is possible that the sea-water, particularly in countries bordering upon the ocean, may filter through the earth, and produce springs; and such springs have generally a taste resembling that of the waters whence they originate. But the springs which are met with near the summits of high mountains, cannot proceed from such a cause, for the sea-water cannot ascend so high.

All the causes we have now enumerated contribute more or less to the origin of fountains; and perhaps there are still other causes operating, of which we are ignorant. Nature is always simple in her operations; but this simplicity does not consist so much in employing only one cause to produce each effect, as in employing in every case the fewest possible causes; by which the presence of auxiliary causes concurring to pro[illegible] the proposed effect of nature, is not prevented.

Be this, however, as it may and though the origin of fountains were more doubtful and obscure than it really is, we must look up to God as the Creator and Preserver of these salutary springs. "He speaks, and the fountains play from the bosom of the hills. The springs become rivulets, and these swell into noble rivers, which carry fertility and abundance through a country. The inhabitants of the meadows allay their thirst in the pure streams and seek repose in the shady groves through which they gently flow." God causes the beneficent fountains to spring from the high places of the earth: sometimes they wind among the mountains, till their meanders are lost amid the distant plains; or they precipitate themselves in cataracts, and increase by the union of the different streams. Thus God preserves in the kingdom of nature that continual circulation which contributes to the fertility of the earth, the salubrity of our dwellings, and the evacuation of water where too great abundance would be prejudicial to us.

NOVEMBER XV.

Hair of the Head.

If we examine the curious structure and various uses of the hair which covers and adorns our heads, we shall find it well worthy of our attention, and discover in it evident proofs of the wisdom and power of God.

Each hair appears to the naked eye, an oblong slender filament, with a bulb at the extremity thicker and more transparent than the rest of the hair. The filament forms the body of the hair, and the bulb the root. The large hairs have their roots, and even part of the filament, inclosed in a small membraneous vessel or capsule. The size of this sheath is proportionate to the size of the root, being always rather larger, that the root may not be too much confined, and that some space may remain between it and the capsule. The root or bulb has two parts, the one external, the other internal. The external is a pellicle composed of small laminæ; the internal is a glutinous fluid, in which some fibres are united, it is the marrow of the root. From the external part of the bulb proceed five, and sometimes, though rarely, six small white threads, very delicate and transparent, and often twice as long as the root. Besides these threads, small knots are seen rising in different places; they are viscous, and easily dissolved by heat. From the interior part of the bulb proceeds the body of the hair, composed of three parts; the external sheath, the interior tubes, and the marrow.

When the hair has arrived at the pore of the skin through which it is to pass, it is strongly enveloped by the pellicle of the root, which forms here a very small tube. The hair then pushes the cuticle before it, and makes of it an external sheath, which defends it at the time when it is still very soft. The rest of the covering of the hair is a peculiar substance, and particularly transparent at the point. In a young hair this sheath is very soft; but in time becomes so hard and elastic, that it springs back with some noise when it is cut. It preserves the hair a long time. Immediately beneath the sheath are several small fibres which extend themselves along the hair from the root to the extremity. These are united amongst themselves, and with the sheath which is common to them, by several elastic threads; and these bundles of fibres form together a tube filled with two substances; the one fluid, the other solid; and these constitute the marrow of the hair.

An attentive observer of the works of God must acknowledge that his wisdom is displayed in the structure of a hair, as well as in the other parts of the human body. Thus from the crown of the head, to the [illegible] of the foot, there is nothing in man that does not [illegible]ote the perfection of his Creator. Even those parts which appear the least considerable, those which might be the easiest dispensed with, become important if we consider them in their relation with the other members of the body, or if we examine their wonderful structure and destination. This particularly is the case with the hair. Yet there are many people who do not think it is worthy of their attention, and who do not imagine that any traces of the wisdom and goodness of God can be discovered in its formation! But, independent of the general principle, that there is no part of our body which is not useful, or without design, it is very easy to assure ourselves of the wise ends for which hair has been given to us. In the first place, it contributes very much to the beauty of the countenance: and perhaps this is its least use. It preserves the head from the effects of cold and wet, and promotes an insensible evacuation of superfluous humours from the body. Besides these, it may be useful in many other ways; and though we may not be acquainted with them all, we know enough to find great cause to admire and adore the wisdom, power, and goodness of our Creator, in this as well as in every other part of our structure.

NOVEMBER XVI.

System of the World.

From the consideration of the earth, which hitherto has principally occupied our attention, let us elevate our thoughts to those innumerable worlds, compared with which, this globe, which we and so many creatures inhabit, is but a point and a speck in the vast system of the universe. Let us examine, meditate, and adore.

In a preceding reflection we described the solar system, the revolution of the earth, and the course of the planets. To meditate upon the heavenly bodies, investigate their motion, order, and arrangement; to observe their magnificence, number, harmony, and beauty, fills the mind with the most sublime ideas of the Creator. We feel our own littleness, and bow with awful reverence, and devout humiliation, before that ineffable Being, whose throne is the starry heavens, and who, though surrounded by myriads of angels and cherubims, deigns, through the glory of numerous suns, to look down with compassion upon the sufferings of human nature, and cheer the heart of man with divine consolation. Glory be to God the Father, and the Son, for ever and ever!*

NOVEMBER XVII.

Lobsters.

LOBSTERS would be very deserving of our attention, even if they were of no use to us as an article of food. The females of these crustaceous animals, a little before this period of the year, undergo a great change. They cast off their old coverings, and acquire new ones; in thus changing their covering, they at the same time increase in size; and this manner of growing is peculiar to all crustaceous animals, which augment in bulk every time they throw off their old shells; and the operation is very painful. At the time of their change, their stomach also is renewed; for both it and the intestines are then detached from the body; they gradually dissipate, and it would appear that the animal, during that change, fed upon the parts which before were subservient to digestion. The small white and round stones, which are improperly called crab's eyes, begin to form when the stomach is destroyed, and are afterwards enveloped in the new one, where they continually diminish in size, till at length they entirely disappear. There is reason to believe that the animal makes use of them as a remedy against the diseases of its stomach, or that perhaps they are the receptacle which supplies the matter which they use to repair the loss of their shells.

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* The translator has ventured to differ from the original very materially in the above reflection, which too nearly resembles one already written, to be repeated, and must have escaped the thor's attention.

Except at the time when they cast their shells, these animals keep at the bottom of the water, at a little distance from the shore. In winter they prefer the bottom of deep water, but in summer approach nearer the shore, if the want of food does not oblige them to plunge deeper in the sea. To enable them more easily to seize their prey, nature has given them several arms and legs. Some of their claws at times are as large as the head and trunk taken together. They also possess the singular property of reproducing their claws and horns when they have been broken; they can even get rid of them when they are troublesome. They can perform this operation in any posture, but it is more easily effected when they lay on their backs, and the shell is broken, and the flesh bruised with strong pincers at the third or forth joint of the claw. Immediately after the wound, the animal bleeds; the pain causes a general shaking of the limb, and soon afterwards the wounded part detaches itself suddenly from the body. When the claw has been broken, a gelatinous substance oozes out, and staunches the blood: and if this was taken away, the animal would bleed to death. This gelatinous matter envelopes the rudiments of the new limb, which at first appears only like an excrescence, or small cone; and gradually becoming longer, takes the form of a limb, thus replacing the old one.

The manner in which these animals are propagated is very singular. The male carries the prolific matter in a very long thread. What chiefly distinguishes it, is a double hook under the tail, which is not observable in the female. These animals are impregnated about autumn; and if at that time a female lobster is opened, the evidences of impregnation are perceived by the presence of several red clots. These gradually disappear; and under the tail, where the female has several little fibres, small round eggs are seen resembling hemp-seed. The first eggs are visible in December, and soon amount to more than a hundred. As the warmth of the air increases, they grow larger, and before Midsummer, small live lobsters are found amongst the eggs, of the size of an ant, and which remaining attached to the fibres, under the mother's tail, are fostered there, till all the eggs are hatched. They then detach themselves from these fibres, and clinging to those of the roots of trees, and herbs, which grow in the water near the shore, they there remain enveloped, till they are sufficiently large and strong to abandon themselves to the waves.

The lobster may justly be regarded as one of the most extraordinary creatures that exists on the earth. An animal, whose skin is a stone, which it casts off every year, and receives a new covering; an animal whose flesh is in its tail and feet, and its hair within its breasts; whose stomach is in its head, and is yearly renewed, whilst the first function of the new stomach is to digest the old one; an animal, that carries its eggs in the interior of the body while they are unimpregnated, but when that operation has taken place, carries them externally under its tail; an animal, with two stones in its stomach, which are there engendered, and receive their growth, and upon which it feeds till they are consumed; an animal, which of itself can get rid of its limbs when they are inconvenient, and which replaces them with others; and whose eyes are placed on long moveable horns; must ever be regarded as a most singular creature, furnishing us with new motives of admiring and adorning the wisdom and power of th[illegible]lmighty Creator.

NOVEMBER XVIII.

Advantageous Situation of all the Parts of the Human Body.

If we attentively examine the different parts which compose the human body, we shall find that they are situated in the most convenient manner for their different uses. It belonged to the Creator to arrange them as seemed best to him; and his wisdom has assigned to every member that place which is most proper for it; and in forming our bodies, he has not only provided for their necessities and convenience, but he has also paid attention to their beauty and ornament.

With regard to our wants, it is manifest that all the parts of our body are situate in the most convenient manner. Our body was to be a machine, capable of moving of itself, by the power given to it, without the necessity of receiving an impulse from an external force. It was requisite that our limbs should execute with promptitude and celerity the volitions of our soul. All the bones are united to each other; and that we may easily use our limbs, extend or shorten the arm, lower or raise ourselves at pleasure, the bones are divided into several articulations, and each one is terminated by a round head, which is received into a cavity formed for it in another bone, and it moves in this without any inconvenience, because it is covered with a smooth and polished cartilage, and moistened by an oily fluid, which thus prevents the cartilages suffering from friction. It is very remarkable that these bones are yet so firmly fixed in their sockets, that they do not slip, and move for each other, though the feet have to support such a heavy burden, and the hands are sometimes obliged to bear very heavy weights.

God has also provided for our convenience in the arrangement and disposition of the different parts of our body. The determinations and desires of the soul may be executed by the different organs of the body without trouble or impediment. By means of the senses the mind is readily informed of all that can interest it, and the different members of the body obey its orders. The eye, which watches over the whole body, occupies the most elevated place; it turns with facility in all directions, and can observe all that passes. The ears are also placed in a conspicuous situation, on each side of the head, and they are open day and night to communicate to the soul every impression of the mind. As the aliments have to pass into the mouth before they arrive in the stomach, the organ of smell is placed immediately above, to preserve us from eating any thing noxious or prejudicial. As to the sense of touch, it has not its immediate seat in any one particular place, but is distributed to every part of the body, that we may be sensible of pleasure and of pain, of those things that are injurious, and of those that are salutary. The arms, which are the ministers that the soul employs to execute most of its desires, are situated near the breast, where the body has the greatest power, and without being too far distant from the inferior parts, they are placed in that manner which is most convenient for all kinds of exercise and labour, and for the defence of the head and other members.

Lastly, the Creator, in forming our body, has also condescended to attend to its beauty; which he has made to consist in the harmony and exact proportion of the members, and in the agreeable blending of colours with a fine and delicate skin. Thus we see that the parts of the body which are double, as the eyes, the ears, the arms, the legs, are placed on each side the body at an equal height, answering to right and left; while those that are single, as the forehead, the nose, the mouth, and the chin, are situated in the middle. This proportion obtains in the small as well as in the great. The length of the sole of the foot makes the sixth part of the height of the whole body, as that of the face is the tenth part. In infants, the head is greater in proportion to the rest of the body; the reason of which is, that the head being the principal part of the body, and the seat of the senses, it ought sooner to arrive at perfection; and the more so, as being chiefly composed of bones, it cannot extend like the fleshy parts, which otherwise it would have done. For in infancy we observe, that all the limbs grow at the same time, and extend themselves in length, breadth, and thickness, in such exact proportion, as always to be in harmony with the size of the whole body.

Admire, then, O man, the perfection and beauty of thy body; the relation, harmony, and proportion which are preserved in all its parts! Observe how each member is connected with another, without their ever being embarrassed, or impeding each other in their different functions; how they are placed in the most suitable places of the body, the more easily to fulfil their different functions, and mutually to assist one another! All these organs are so many springs in the wonderful machine; they correspond together, and act in concert to complete the several purposes for which they are designed. Be careful not to destroy this beautiful machine, or injure it by thy disorders and excesses. Be careful not to degrade it by base and infamous passions. But so act that thy body may be a living monument of God's wisdom and goodness. And more especially neglect nothing that can tend to improve thy soul, which has been so debased by sin; and use all thy endeavours to re-establish it in its original purity by the grace and mediation of thy Redeemer.

NOVEMBER XIX.

Order and Regularity of Nature.

When we contemplate the world, we discover in every direction the traces of a Supreme Intelligence, which has ordered every thing, and foreseen all the effects that would result from the powers which were imparted to nature; an Intelligence which has considered, weighed, and measured all things to answer his designs with a wisdom that is infinite. Thus, the universe being once formed, can subsist for ever, and constantly fulfil its destination, without any necessity for the first established laws being changed. Whilst the contrary is too often the case with the works of men. Machines the most skilfully constructed soon cease to answer their intended purposes; they require frequent repairs, are soon worn out, and rendered unfit for use. The cause of these derangements and irregularities is to be looked for in their general construction; for there is no artist, however able he may be, who can foresee all the changes to which his works will be subjected, much less can he obviate them.

The corporeal world may also be regarded as a machine, whose component parts and different uses are innumerable. It is divided into several globes, luminous and opake, which serve for habitations to an infinite number of living creatures of every species. The opake globes move in orbs prescribed to them, and at regular periods, round the luminous globes, and receive from them their light, heat, day, and night, diversity of seasons and temperature, growth and nourishment, according to the nature and wants of the different inhabitants. The position and mutual gravitation of the planets are so diversified, that it seems almost impossible to determine beforehand the time when they will return to the point whence they set out, and recommence their periodical course. And, notwithstanding the diversity of phenomena which these globes present to us, and the astonishing multiplicity of their movements, it has not once happened in the course of thousands of years, that these enormous masses have ever in the least interrupted or obstructed each other in their revolutions. All the planets regularly traverse their orbs in the time allotted them. They have always preserved their order and respective distances, and have not approached nearer to the sun. Their forces are always in equipoise, and preserve the same relation to each other. The fixed stars are the same to-day as they were a thousand years ago; nor has any alteration taken place in the height of the sun; the duration of night and day; or the length of years and seasons. An incontestible proof that in the first arrangement of the heavenly bodies, in the measure, the laws, and the relations of their forces, in the regularity and the rapidity of their course; the Author of Nature has foreseen and determined the future state of the world, and of its component parts, to the utmost limits of time.

The same may be said of our earth, in as much as it is annually subject to different revolutions and changes of temperature. For though it may at first seem as if fine weather, cold, heat, rain, dew, snow, hail, storms, lightning, and winds, vary indifferently, and are dispensed by accident; that it is by mere chance that waters inundate the earth, and convert dry land into lakes, and produce continents where once were seas; that some mountains are formed, whilst others moulder into dust; that rivers dry up, or change their course; yet, it is certainly true that each modification of our earth has its sufficient cause in that which precedes it, and the whole in that which was established in the beginning of the creation.

Nothing is more proper to convince us how little we know of the particular causes of natural events, and their connection with the future, than that diversity which we observe in the temperature of the air; a diversity that has so much influence upon the aspect and fertility of our globe. In vain may we multiply our meteorological observations; we cannot with any certainty deduce from them certain rules and consequences for the future; and we never find one year exactly resemble another. However, we are well assured that these continued variations, this seeming confusion of the elements, neither alter the figure of our globe, destroy its equilibrium, nor render it uninhabitable; but, on the contrary, that they are the true means of preserving, from year to year, its order, fertility, and abundance.

Thus, the world is not composed of unconnected, disjointed materials, of parts without relation or dependency upon each other; but is a regular and perfect whole, whose structure and arrangement are the work of a Supreme Intelligence. If we see in the world a multitude of beings with the same nature and destination as ourselves, and catenated together by a number of links; if we discover classes and species of other creatures still more numerous, which have also mutual ties of connection more or less distant; if we acknowledge that by the mixture and action of the elements, all these animated beings are supported, and receive all that their nature requires; and if we then elevate our views, and carrying them further, consider the relations which exist between our earth, and the heavenly bodies; their constant regularity of motion, the conformity and wonderful harmony that prevail between all the spheres within our sight, we shall be more and more filled with admiration and astonishment at the magnificence, order, and beauty of nature, and shall be more deeply convinced of the infinite wisdom of the Creator; and from what we are permitted to know at present of the beauty and harmony of the material world, we may form some faint idea of the glory of that eternal light which will one day manifest to the righteous, in the regions of bliss, the presence of their God, and enable them to read in the book of wisdom.

NOVEMBER XX.

Of Winter in the Northern Countries.

THE time now approaches when the discontent of many people is excited. The rigorous season of winter seems to them to counteract the otherwise sage and beneficent plan of the Father of the Universe: the rich complain that nature is become desolate and dreary; and the poor murmur because in this season their necessities are increased, and their indigence is more oppressive. Though ungrateful men may magnify the inconveniency and the miseries of winter, they will be forced in the end, if they compare their lot with that of some other nations, to acknowledge how much goodness and mercy God extends to them in this respect.

In many of the northern countries, there is neither spring nor autumn; while the heat in summer is as insupportable as the cold in winter; which last is so intense, that spirits of wine congeal in thermometers. When the door of a heated chamber is opened, the external air penetrating it, converts into snow all the vapours which it contains, and the people who are in it are thus encompassed in a cloud of white thick flakes. If they go out of their houses they are nearly suffocated, and the air seems to tear their lungs. Death appears every where to reign, no one daring to quit his abode. Sometimes the cold is so severe, and comes on so suddenly, that if a man cannot escape with sufficient celerity, he is in danger of losing an arm or a leg, or even life itself. The fall of snow is still more dangerous; the wind driving it with such violence, that the roads are blocked up; the trees and bushes are covered with it; and every step plunges the unwary traveller in some new precipice. In summer, for three months successively there is constant day, and in winter for the same space there is a continued night.

What would those people say, who complain of its being cold in this country, if they were obliged to live in such a climate as that which we have just described? It is certain we do not sufficiently know the advantages we possess, or a very slight reflection would suffice to render us content with our lot. The days of winter, however severe we may think them, even in this country, are, nevertheless, supportable; and if some people suffer much from them, it is commonly owing to improper living that they have reduced themselves to such a state of effeminacy.

Some people will perhaps ask, why the Creator has assigned as an abode to so many thousands of men, countries where during a great part of the year nature is seen clothed with terror? Why has he not favoured these people as much as he has blessed us? Vain questions! it is an error to suppose that the inhabitants of the poles are unhappy from the severity and the length of their winters. Poor, but exempt by their simplicity from all desires difficult to be gratified, these people live contented and are happy in the midst of the icy rocks which encompass them, without knowing the comforts that the inhabitants of more temperate countries regard as the most essential to their felicity. If the dryness of the soil prevents the productions of the earth from being so varied as are those of our climate, the sea compensates for it by gifts equally rich. The manner in which these people live inures them to the cold, and enables them to brave the storms; and nature has supplied them with the necessary assistance to support the rigours of their climate. She has given them the rein-deer, from which they obtain their nourishment, bedding, clothing, and tents; and thus their principal wants are satisfied by an animal which costs them very little for its maintenance. Their deserts are filled with wild beasts, whose furs secure them from cold. Though the sun does not shine upon them, and they are enveloped in darkness, nature herself lights for them a torch, and the aurora borealis faintly illumines their nights. And these very people consider their country as the most happy and extensive in the universe, whilst they regard us with as much pity and contempt as we can possibly feel for them.

Thus every climate enjoys its advantages and disadvantages, and these are generally so equally balanced, that it is difficult to say which has the preference. Considering it in this point of view, there is no country upon the earth can be said to be more advantageous than another; whether the sun throws his rays upon it in a particular direction, or whether they are received obliquely; or whether eternal snows whiten the surface. In one place the conveniences of life are more abundant; in another the variety of blessings is not so great; but to compensate for this, the inhabitants are less subject to temptations, to corroding cares, and piercing remorse; they do not experience many obstacles to their happiness, and this doubtless compensates for many enjoyments of which they are deprived And of this we may be certain, that Providence has distributed to each country all that was necessary to the support and happiness of its inhabitants; every thing is suited to the nature of the climate, and God has provided by the wisest means for the wants of all his creatures.

NOVEMBER XXI.

Transformations in Nature.

Numerous transformations take place in nature; indeed, it may be said that every thing in the physical world, at one period or another, is metamorphosed. The figure of objects continually varies; certain bodies pass successively through the three kingdoms of nature; and there are compound substances which gradually become minerals, plants, insects, reptiles, fish, birds, quadrupeds, and man. Every year millions of bodies blend together, and are reduced to dust. Where are the flowers, which, during the spring and the summer, ornamented our fields, and our gardens? One species has appeared, withered, and given place to others. The flowers of March, and the modest violet, after announcing by their presence the arrival of spring, have yielded their place to the tulip and the rose. In the room of these, we have seen others, till all the flowers have fulfilled their design. The same holds good with regard to man. One generation shows itself, and another disappears. Every year thousands of human bodies return to the dust from whence they were taken; and of these evanescent bodies others more beautiful are formed. The salts and the oils of which they were composed, dissolve in the earth; the more subtle particles are raised into the atmosphere by the sun's heat, and mixing there with other matters, are dispersed in different directions by the winds. and fall down in rain and dew, sometimes in one place, and sometimes in another; whilst the grosser particles mix with the earth The grass which is nourished by them, grows up into long blades; and it is thus that the flesh of men, transformed into grass, serves as aliment to the flocks, whose wholesome milk is again converted to our own subsistence.

These continual transformations thus operating in nature, are so many certain proofs that the Creator has designed that nothing should perish or be useless. The dust of flowers, used in the fecundation of plants, is only a very small part of what each flower contains; and that the superabundant portion may not be lost, bees are created, which make use of it to form their honey. The earth daily presents us with new presents, and it would in the end be exhausted, if what it gives was not in some way or other returned again.

All organized bodies suffer decomposition, and are at last converted into earth. During this dissolution, their volatile parts rise into the air, and are dispersed in every direction. Thus the remains of animals are diffused through the air, as well as through the earth and the water. All these particles so dispersed, unite together again in new organic bodies, which in their turn will undergo similar revolutions. And this circulation, and these continual metamorphoses, which commence with the world, will only termimate with its dissolution.

The most remarkable transformation, or at least that which interests us the most, is that in which we are immediately concerned. We know that our body was not once composed, and will not be so in the end, of the same number of parts as it is when in its greatest perfection. Our body, when in our mother's womb, was extremely small; it became much larger when we were brought into the world, and since then has increased to fifteen or twenty times the bulk it then had; consequently blood, flesh, and other matters supplied by the vegetable or animal kingdom, and which formerly did not belong to our body, have been since assimilated to it, and are become parts of ourselves. The daily necessity of eating, proves that there is a continual waste of the parts of which we are composed, and that this loss must be repaired by alimentary matter. Many parts insensibly evaporate; for since the experiments which a certain great physician made upon himself, it is ascertained, that of eight pounds of nourishment necessary to support a healthy man in one day, only the fiftieth part is converted into his own substance, all the rest passing off by perspiration and other excretions. Hence, also it may be inferred, that in ten years, there will not remain many of the same particles that now constitute our bodies. And at length, when they shall have passed through all their different changes, they will be converted into dust, till the blessed day of the resurrection; when they will undergo that happy and final revolution that will place them in a state of eternal rest.

NOVEMBER XXII.

The Greatness of God is perceptible in the least Things.

He who loves to meditate upon the works of God, will not only trace him in the immense spheres which compose the system of the universe, but also in the least bodies of insects, plants, and metals. He will find and adore the Divine Wisdom in the spider's web, as he would in that power of attraction which preserves the planets in their orbs. These researches are facilitated by the use of the microscope, which discovers to us new worlds, where we may admire in miniature much that will excite our admiration. And those who have not had opportunities of using these instruments, will at least read with pleasure some account of microscopic objects.

Let us first consider the inanimate world. Let us observe the mosses and small herbs which nature produces in such abundance. How numerous are the subtle parts and delicate fibres contained in these plants! How diversified their form and appearance! How innumerable their species! Let us think upon the immense number of minute parts of which every body whatever is composed, and which may be separated from it. If an hexagonal body of an inch square, contains a hundred millions of visible parts, who can calculate all the parts contained in a mountain? If a million globules of water can be suspended at the point of a needle, how many ought there to be in a jug, a well, a river, a sea? If from a lighted taper there are emitted in the space of one second, more particles of light, than there are grains of sand on the whole earth, how many ignited particles ought there to pass from a large fire in the space of one hour? If a grain of sand contains several millions of particles of air, how many must there be in the human body? If we can divide a single grain of copper into millions of parts, without arriving at the elements of matter; if odoriferous bodies can exhale fragrant particles enough to perfume the air at a great distance, without the body losing any thing of its weight; the human mind would require an eternity merely to reckon the prodigious number of these particles.

If we now pass to the animal creation, our views will be infinitely extended. During the summer, the air swarms with living creatures. Each drop of water is a little world teeming with inhabitants; every leaf is a colony of insects; and every grain of sand serves as an abode to multitudes of animate beings. Every plant, seed, and flower, nourishes millions of creatures. Every person must have seen those innumerable swarms of gnats, flies, and insects, which collect together in a very small space: what prodigious hosts of them must then live, enjoy themselves, and multiply upon the surface of the earth; and in the immense extent of the atmosphere! How many myriads of insects, worms, and reptiles, must creep upon the earth, or be contained within its bosom, a number so great as to be known to God alone! How splendidly manifest is his power when we think of the multitude of parts which form these little creatures, of whose very existence many men are entirely ignorant! Were we not assured of it by daily experience, could we imagine that there are animals which being a million of times smaller than a grain of sand, have yet organs of nutrition, motion, and generation! There are shell-fish so minute, that seen through a microscope, they scarcely appear so large as a grain of barley; and yet they are living animals, with secure habitations, whose different folds and cavities form so many chambers. How very small is a mite, and yet almost imperceptible as it is seen through a microscope, it is found to be a hairy animal, perfect in all its limbs, of a regular form, full of life and feeling, and provided with all the organs necessary to it! Though this animal nearly escapes our perception, it possesses a multitude of parts much smaller: and what is still more wonderful is, that the glasses which enable us to discover so many faults and imperfections in the most finished productions of men, only more plainly indicate the regularity and perfection of these minute creatures. How inconceivably fine and delicate are the threads of a spider! It has been calculated that thirty-six thousand would not more than make the thickness of a thread of common sewing silk. Each of the six papillæ, whence the spider draws that glutinous liquor with which it forms its web, is composed of a thousand insensible pores through which so many threads pass, so that each visible thread of the spider is composed of six thousand smaller ones.

Great as these wonders may appear, they are far short of those we should discover, were it possible to obtain glasses of greater magnifying powers; and even then we could never reach the limits of the creation; though our microscopes magnified objects many millions of times more than they now do. The more we contemplate the works of God, the more will the proofs of his power be multiplied. We are confounded by the two extremes of nature; the great and the small; and we scarcely know whether to admire the Creator most, in the immense spheres which roll their orbs in the heavens; or in those minute productions which are almost imperceptible to our eyes.

Let us, then, henceforth, regard the contemplation of the works of God as our most delightful employment. The trouble that we take in investigating them will be amply compensated by the pure and innocent pleasures which they will procure us. We shall have an ardent desire awakened in our minds to arrive in those blessed regions, where we shall require neither microscope, nor telescope, to discover and to become acquainted with the wonders of God; where all his works will be presented to the eye in unveiled beauty, and where we shall distinguish in each object its relations, structure, and destination; where hymns of praise will be chanted by immortal spirits in celebration of the Creator of the universe, and where all distinctions between great and little will be lost in one grand whole, that will fill our souls with joy, love, and admiration.

NOVEMBER XXIII.

Gradual Increase of the Cold.

THE cold begins now to increase perceptibly. With the past month, much of the autumnal warmth has departed. It is already colder, and the shorter the days become, the more will the earth lose its heat. This we daily experience, and it requires only a slight degree of attention to discover in this arrangement the wisdom and goodness of God.

This gradual increase of cold is necessary to prevent the indisposition, and perhaps the total destruction of our body. If the cold that we experience during the winter months, came suddenly with the commencement of autumn, we should be benumbed, and the suddenness of the change might be fatal to us. As it is, we are very liable to catch cold in the cool summer evenings; how, then, would it be, if we suddenly passed from the burning heat of summer to the piercing cold of winter? How mercifully has the Creator provided for our health and our lives in thus granting us in those months which immediately succeed the summer, a temperature that gradually prepares our bodies to bear more easily the increase of cold! What would become of those animals whose constitution cannot bear a great degree of cold, if winter suddenly came without any previous preparation! The greater part of birds and insects would perish in a single night; and with them their eggs and their young. Whereas, by the gradual augmentation of the cold, they have time to make the necessary preparations for their preservation. The autumnal months, which separate the winter from the summer, warn them to quit their abodes, and repair to warmer climates, or to seek out places where they may pass quietly, and in safety, the rough season.

It would be equally fatal to our fields and our gardens, if they were to be suddenly deprived of the summer heat: all plants, and particularly exotics, would inevitably perish; and the spring could no more yield us flowers, nor the summer fruits.

It is, therefore, but just that we should acknowledge in this arrangement, the wisdom and the goodness of God; and not regard it as a matter of little consequence, that from the last days of summer to the commencement of winter, the heat as gradually diminishes as the cold increases. These insensible revolutions were necessary, that we and all other creatures might be able to subsist, and that the earth might continue to open to us her rich stores. Let the presumptuous man, who so often dares to blame the laws of nature, only displace one single wheel in the vast machine of the creation, and he will soon have occasion to feel the injury he has done, and learn to his sorrow, that though he might disorganize the arrangements of nature, he could never amend them. Let us, then, receive it as a truth, that nothing is made without just reason; and no revolution happens without a sufficient pre[illegible]on. All material events gradually succeed each other; all are preserved in the most regular order; and all take place exactly at the appointed time: order is the great law with which God rules the universe, and hence it is, that all his works are so beautiful, invariable, and perfect.

If it was our constant occupation to study this beauty and perfection in the works of God, and to acknowledge in every season of the year the traces of his Divine power and goodness, we should hear no more of those foolish complaints by which we dishonour our Creator; but we should ever find order, wisdom, and goodness, even in those productions where we only expected to discover disorder and imperfection; and we should say from the fullest conviction, "All the paths of the Lord are truth and mercy; all his conduct towards his creatures, love and kindness; and may we ever revere his covenant, and cherish his precepts."

NOVEMBER XXIV.

Snow.

During winter, we frequently see the ground covered with snow. Every body observes it fall, but very few people give themselves the trouble to inquire into its nature and uses. Such is too generally the case with those objects which daily come under our notice, and from which we derive very considerable advantages. Often, indeed, the very things most deserving of our attention, are those which we chiefly neglect. Let us henceforth be more rational, and begin by devoting some moments to the consideration of snow.

It is formed by very subtle vapours, which being congealed in the atmosphere, fall down in flakes more or less thick. In our climates these flakes are pretty large, but we are informed, that in Lapland they are sometimes so small as to resemble a fine dry powder. This is doubtless caused by the extreme cold which prevails there; and it is also remarked, that in our own country the flakes are greater in proportion as the cold is less severe, and they become less when it freezes strongly. The little flakes generally resemble hexagonal stars; sometimes, however, they have eight angles, and at others ten, and some of them have an irregular shape. The best way of observing them is to receive the snow upon white paper. Hitherto, little has been said of the cause of these different figures. The whiteness of snow may be thus accounted for; it is extremely light and thin: consequently full of pores, and these contain air, it is further composed of parts more or less thick and compact; and such a substance does not admit the sun's rays to pass, neither does it absorb them, on the contrary, it reflects them very powerfully, and this gives it that white appearance which we see in it.

Snow, as it falls, is twenty four times lighter than water: which may be proved by melting twenty-four measures of snow, and they will be found to produce but one of water. Snow evaporates considerably, and the greatest degree of cold does not obstruct this evaporation It has been doubted whether snow ever falls at sea, but those who have navigated the northern seas in winter, affirm that they have there seen much snow. It is well known that high mountains are never entirely without snow, and though a small portion of it is sometimes melted, new flakes soon replace it. The air being much warmer in the plains than it is on the mountains, it may rain on the one, while it snows on the other.

Snow has several uses. As the cold of winter is much more destructive to the vegetable than to the animal kingdom, plants would perish if they were not preserved by some covering God has then designed, that the rain, which during the summer descended to refresh and re-animate the plants, should fall in winter like soft wool, to cover and protect them from the injuries they must otherwise have sustained from the frosts and the winds. When the snow melts, it becomes a fruitful moisture to the earth, and at the same time washes away from the winter seeds and plants, every thing that might prevent or injure their growth;

and any superabundance of melted snow that then remains, goes to supply the rivers and springs that suffered during the winter.

These reflections may suffice to convince us of the goodness of God manifested in the meteor of which we have just treated: and let us raise our hearts in joy and gratitude to that beneficent God, who even from clouds and snow pours down blessings and abundance upon the earth.

NOVEMBER XXV.

Sleep of Animals during the Winter.

NATURE being deprived of so many creatures which in summer rendered her lively and cheerful, now appears gloomy and dead. Most of the animals which have disappeared, are buried during the winter in a profound sleep. This is the case with caterpillars, May-bugs, ants, flies, spiders, snails, frogs, lizards, and serpents. It is an erroneous supposition that ants lay up a store of provision for the winter; the least cold benumbs them, and they continue in a state of torpescence till the return of spring: of what use, then, would be magazines, since nature has prevented the necessity of their having food in the winter, and it is not very probable that they should lay up stores for other animals. That which they so carefully collect during the summer, does not serve them for their subsistence; they make use of it in the construction of their habitations.

There are many birds, which when food begins to grow scanty, conceal themselves in the earth, or in caverns, where they sleep during the winter. It is certain, that at the beginning of winter, the swallows which dwell near the sea-shore, and banks of rivers, hide themselves in the earth; and the wall-swallows in the hollows of trees or in in old buildings; and the house, or common swallows, seek the bottom of lakes and ponds, where they attach themselves in pairs, and clinging to reeds, remain there seemingly without life or motion, till the return of warm weather re-animates them.

There are also some quadrupeds which, at the close of summer, bury themselves in the earth. Of these, the most remarkable is the marmont, or mountain rat, which generally lives on the Alps. Though it delights in the highest mountains, in the regions of ice and of snow, it is yet more subject than any other animal to the benumbing influence of cold. Hence it is, that the marmonts retire about the end of September, or the beginning of October, into their subterranean abodes, where they continue till the mouth of April. Much art and precaution is observed in the arrangement of their winter habitations. It is a kind of gallery, the two wings of which have each a particular opening; and both terminate in a place where there is no outlet; and here they dwell. It is lined with hay and moss. These animals do not lay up provisions for the winter, because they do not require any. Before entering into their winter-quarters, each of them very carefully prepares for itself a bed with hay and moss; and then, after having exactly closed both the entrances into their retreat, consign themselves to sleep; and as long as they remain in this state, they do not eat any thing. At the beginning of winter they are so fat, that some of them weigh nearly twenty pounds, but they gradually become thinner, and towards spring are very lean. When they are discovered in their retreats, they are found rolled up like a ball enveloped with hay; and during their torpid state they may be carried away without their awakening, and even to be killed without their appearing to feel.

Bears eat prodigiously at the beginning of winter: they are naturally fat, and at that time are still more so, and it is by this exuberance of fat that they are enabled to endure their long abstinence during their repose in winter. Badgers prepare themselves for their winter's repose in the same manner, before they enter their retreat.

The instinct of these, and other animals, thus teaches them how to live as long a time without nourishment. From their first winter, and before experience can have informed them, they foresee and prepare for their long sleep. In their quiet retreat they neither experience want, hunger, nor cold, and they know no other season than summer. Thus the wisdom and goodness of God has provided for the wants of all his creatures; and this he effects by a thousand different means which human intelligence cannot conceive; and from all this we may safely conclude, that as he watches over and preserves every one of his works, he will also condescend to guard us from danger, and preserve us from all evils.

NOVEMBER XXVI.

Use of Storms.

During this stormy season of the year, perhaps some discontented people may regard winds and tempests, which are now so frequent, as the disorders and scourges of nature; they do not consider the advantages which result from them, nor that without them we should be a thousand times more unhappy than we really are. Storms are the best means of purifying the atmosphere. To be convinced of this, we have only to pay attention to the weather which prevails in this season. How many thick and unwholesome fogs, rainy, dark, and cloudy days, are we subject to! Storms are chiefly instrumental in dispersing these noxious vapours, and by thus driving them from us, are very beneficial. The universe is governed by the same laws as man, whom we may compare to a little world. Our health in a great measure consists in the agitation and mixture of our different humours, which otherwise would grow corrupt. And so it is with the world. That the air may not become injurious to the earth and to animals, it requires to be in a continual agitation. This is effected by the winds; not, however, those that are gentle and light, but by storms and tempests, which collect together vapours from different countries; and forming one mass of the whole, thus blend together the good and the bad, correcting one by the other.

Storms are also useful to the sea; if it was not frequently agitated with some degree of violence, the stagnation even of salt water, would occasion a degree of putrefaction, not only destructive to the numerous shoals of fish which live in it, but also to the sailors who float upon its surface. Motion is the soul of all nature, preserving every thing in order, and preventing destruction; and the sea, which contains so much animal matter, is not exempted from the general rule; for were it not constantly agitated, its water would become putrid, and cause a general plague. Motion is as necessary to the sea, as the circulation of blood is to animals, and those causes which only produce a gentle, uniform, and almost imperceptible agitation, are not sufficient to purify the whole mass. Storms alone can produce this effect, and the great advantages that result from it not to men only, but to many millions of other creatures.

These, then, are some of the uses which we derive from storms, and they are sufficient to prevent our regarding them any longer as destructive scourges and instruments of wrath. There is nothing in nature which has not its inconveniences, and storms are sometimes very injurious to individuals; but the evils they occasion are slight and partial, compared with the general good that they produce, and we must acknowledge God has arranged every thing with wisdom, and that we have abundant cause to be thankful for the present constitution of things. Happy are they who are convinced that every thing in the universe relates to the general good of all living creatures, that the evil existing in the world is compensated by numberless advantages, and that the very means which Providence employs to prove and to chasten his children, are in themselves indispensable blessings, whose general effects abundantly recompense us for every evil that, in particular instances, may result from their operation.

NOVEMBER XXVII.

Fortuitous Events.

PROPERLY speaking, chance can produce nothing; for nothing can happen without some real and determinate cause. What is generally called chance, is nothing more than the unexpected combination of several causes, which produce an effect altogether unforeseen. Experience teaches us that these sort of occurrences are frequent in human life. Unforeseen accidents may entirely change the fortune of men, and overturn all their designs. It should naturally seem as if the race should be to the swift, the battle to the strong, and success to the most wise and prudent: this, however, does not always happen; frequently an unforeseen accident, a favourable circumstance, an event which could not be guarded against, effect more than the combined efforts of power, of genius, and of human wisdom and prudence. How lamentable, then, would be the destiny of man, if an infinitely wise and beneficent hand did not rule over all events! If the fate of men, of families, and even of kingdoms, often depends upon circumstances which apppear to us petty and trifling; and if we were desirous of withdrawing these events from the superintendence of Providence, we should at the same time deny that he has any influence upon the greater revolutions that take place in the world.

We daily witness the occurrence of accidents upon which our temporal happiness or misery in a great measure depends. It is evident, that we cannot guard against these kind of accidents, because we cannot foresee them; and hence it follows, that these unexpected events, which are beyond the reach of our understanding, and of our precaution and prudence, must be under the especial direction of Providence. God in his wisdom and goodness leaves us more or less to ourselves, according as we have greater or less ability to conduct ourselves with propriety. In those cases, where our power and abilities can effect nothing, we may be assured that God will particularly watch over us for our good; in all other circumstances the labour and industry of men must concur with the favour and assistance of Heaven; for we cannot expect Providence to act alone in any but unforeseen contingencies. As then in every thing that we call chance, we evidently discover traces of the wisdom, goodness, and justice of God, it is manifest that chance itself is subject to divine government, and then it is that the empire of Providence is most resplendent. When the beauty, the order, and the arrangement of the world fill us with astonishment and admiration, we conclude, without hesitation, that an infinitely wise Being must preside over it. What a much more powerful reason have we to draw the same conclusion when we reflect upon the great events that are produced by accidents which no human wisdom could foresee! Have we not a thousand examples, that the happiness and even the lives of men, the fate of empires, the issue of battles, the revolutions of kingdoms, and other similar events, often depend upon entirely unforeseen contingencies? An unlooked-for event may [illegible] projects planned with ability and concerted [illegible] prudence, and may at once annihilate the most formidable power. It is upon a firm belief in the saving efficacy of Providence that our tranquillity and our hope are founded. However great may be the evils which surround us, however terrible the dangers that threaten us, God is able to effect our deliverance by a thousand ways unknown even to ourselves. The firm persuasion of this all-consolatory truth, ought to raise in our minds the greatest reverence of our God, and induce us to seek him in all things, always lifting up our hearts to him, and placing in him all our confidence. The belief in this truth, also, ought to repress our pride, and particularly to inspire those who are in exalted situations with that religious awe which they should have for the Supreme Being, who possesses so many means unknown to them, by which he can shake or overturn that slender fabric of happiness which their arrogance has reared. Nothing is better calculated than the consideration of this truth to banish from our souls all distrust, anxiety, and discouragement, and to raise in us a pure and holy joy. "The infinitely wise Being has a thousand wonderful ways unknown to us; ways of mercy and love; and all his dispensations are regulated by justice and wisdom. He wills the happiness of his children, and nothing can prevent it; he commands, and nature obeys his voice."

NOVEMBER XXVIII.

The Majesty of God.

It is extremely difficult to form any idea of God at all worthy of his majesty and greatness. The attempt, however, should be made; nothing contributes more to dignify and improve our nature than such reflections. It is true, that it is as impossible for us to comprehend him perfectly, as it is for us to hold the sea in the hollow of our hand, or to grasp the heavens with a span. He is at once known to us and concealed from us; he is near us, and at the same time is infinitely above us: known and near with respect to his existence, though infinitely elevated and hidden as to his nature, perfections, and decrees. On this account, it is our duty to apply ourselves to know his greatness, as it is essential for us to conceive those sentiments of veneration which are justly due to him. To assist our weakness in this respect, let us compare God with what men esteem and admire the most, and we shall find that he is infinitely above all.

We may admire the power of kings, and be filled with astonishment when we hear of their conquering vast empires, taking cities and foretresses, erecting superb buildings, and making the happiness or the misery of whole nations. But if we are struck with the power of a man, who is but dust and ashes, and whose exploits are due to other agents, how much ought we to admire the power of God, who has established the earth, and founded the heavens, who rules the sun, and sustains the immense fabric of the universe! We are justly astonished with the heat of the sun, with the impetuosity of the winds, the roaring of the sea, the rolling of the thunder, and the rapidity of the lightning; but it is God who imparteth to the sun his fires, who thunders in the clouds, who uses the winds as is messengers, and sendeth forth the red lightnings as his ministers, and who raises and calms the waves of the sea.

We justly respect those, who have distinguished themselves by the extent of their genius, and the depth of their knowledge; but what is the understanding, what are all the faculties of men, compared with the wisdom of that Great Being, whose eye penetrates through every covering, who numbers the stars of heaven and the sand of the sea, who knows the destination of each drop of rain as it falls from the clouds; and who at once sees and comprehends the past, the present, and the future; all of whose works are infinitely great, surpassing human conception.

We may be dazzled with the splendour of riches, and admire the gorgeous palaces of Kings; the magnificence of their furniture; the richness of their garments; the beauty of their apartments; and the lustre of gold, silver, and jewels, that glitter in lavish profusion: but how pitiful and contemptible are all these, compared with the riches of God, whose throne is heaven, and whose footstool is the earth! He has formed dwellings for all creatures, and established provisions for all men and all animals; his meadows nourish the cattle; and all that is useful or excellent in the world is drawn from his treasures. Life, health, riches, glory, honour, and pleasure, are all in his hand, and he distributes them to whom he pleases.

We respect the princes of the earth who command numerous subjects, and rule over several countries; but what is that speck of earth which is subject to them, compared with the empire of the universe, of which our whole globe is but a small province; an empire that extends over all the stars of Heaven, and their inhabitants! An empire whose Lord has all the sovereigns of the universe for his servants; and around his throne, the cherubim and seraphim, ever ready with wings outspread to execute his orders!

We judge of the greatness of men by their actions, and their works; and we celebrate kings who have built cities and constructed palaces; who have governed well their states, and have successfully executed great enterprizes; but what are the works of the Most High? The creation of the universe; the preservation of so many creatures; the wise and just government of innumerable worlds; the redemption of mankind; the reward of the good, and the chastisement of the wicked!

Who is like unto thee, O Lord! Thou art great, thy name is celebrated, and thy works proclaim thy grandeur! Should not a religious awe possess our souls, at the thought of the presence of the world's Eternal Ruler; the God whose glory ever encompasses us. The splendour of the stars fades in the presence of the sun: and so all the glory, wisdom and power, all the riches and honours of the world are eclipsed by the radiance and majesty of God! Our soul is exalted and enlarged by meditating upon the greatness and excellencies of the Most High: and all our spiritual faculties are rejoiced by such sublime meditations; and our hearts are penetrated with joy, veneration, and gratitude, when in a holy transport we represent to our minds the Being of beings, the Eternal Almighty and Infinite God, to whom be all glory, honour, and praise, for ever and ever.

NOVEMBER XXIX.

Motives for Contentment.

Let our souls enjoy sweet contentment, for God is good; mercy and love shine through all his works. Let us contemplate his mighty deeds; the world, and all that it contains, announce his glory; all that he has created is worthy of him alone.

The heavens and the earth are proofs of his power; the sun who rules the day, and the moon who rules the night; every thing endowed with life and motion exalt the mighty God.

Consider the works of his hands; men and brutes show his infinite power; even the smallest objects, the blade of grass, and the grain of dust, teach us the knowledge of the Most High.

Ask the mountains and the valleys, the heights of heaven, and the depths of the ocean; the winds and the storms; the reptiles that crawl in the dust; and they will proclaim his infinite wisdom and boundless power!

How shall we celebrate and adore that God, who has given us life and being! Our bodies, and the souls which animate them, are the gifts of his hand, and let us, whilst we have a being, bless his holy name!

Objects of his guardian care during the day, each morning witnesses that he has watched over us through the darkness of the night. Every moment that glides away invites us to bless him who is the light and strength of our life.

Are we in adversity, and oppressed by trials and sufferings; scarcely have we felt the weight of our affliction, when our merciful Protector enables us to support them; his victorious arm is stretched forth to assist us, and all our difficulties vanish.

Let us never forget this, nor indulge the fear of being abandoned by God, who loves all his children. And may we ever submit to his holy will, and bless all his dispensations, convinced that he will accomplish his merciful designs, for he is omnipotent in counsel, and abundant in means.

NOVEMBER XXX.

Grateful Remembrance of past Mercies.

Almighty God! thou art the common Father of all the generations which dwell on the earth; thou art my Father also. May I feel myself entirely dependent upon thee, not only for my existence, but also for every thing that I possess; I bless thee, and give thee thanks for the life which thou hast given me, and for all the mercies which thou hast granted me unto the present hour.

I bless thy Providence for the endearing ties of my family, and for all the comforts and pleasures that I enjoy in domestic life.

I am thankful for the life and health which I enjoy, for the abundance of my food and raiment, and for the conveniences of my habitation. I thank thee for the success thou hast given to my enterprises and the labours of my vocation; for all the blessings that thy bountiful hand has daily conferred upon me, and for every thing that has contributed to my preservation and happiness.

I ought also to bless thee, because, when thou at any time didst permit adversity and affliction to visit my habitation, thou didst not leave me hopeless, or without consolation. In the midst of my trials, and the just chastisement which, for my good, thou hast sometimes been pleased to inflict upon me, thou didst not abandon me; but didst soften and render mild the corrections which I suffered, and didst vouchsafe me thy favour and heavenly regard. Thy paternal hand has always guided me, and thou hast rejoiced to do me good.

From the experience which I have had of thy goodness, I will feel a confidence in thee, and commit into thy hands all my concerns and interests; and I will dare to hope that long as it shall please thee to continue the thread of my life, thou wilt continue to watch over me, and, as far as thou deemest it consistent with my real happiness, wilt preserve me from all the evils and accidents that would disturb my repose. Grant, then, O Lord, that I may enjoy with a wise and grateful heart, the favours that thou bestowest upon me; that, in prosperity, my soul may aspire after thee, the Author of all good; and that if thou hast decreed in the impenetrable councils of thy wisdom, that I should experience affliction and disappointment, I may submit with unfeigned resignation to all thy dispensations; and glorify thee to the utmost of my ability, whether basking in the sunshine of prosperity, or stemming the rough tide of adversity.

DECEMBER 1.

Hymn of Praise.

When I reflect upon the unmerited mercies which I have received from thy hands, O Lord, my soul is astonished, and lost in admiration. Overwhelmed with thy goodness, my heart swells with joy, and I am unable to express the transports of my gratitude.

While yet asleep, unconscious of life, in my mother's womb, thy guardian cares watched over me; and when I first drew my breath, thou didst incline thine ear to my infant cries; my tender lips could not then utter thy praises, and thou didst condescend to listen to my feeble accents, before they were formed into prayers; and when in the thoughtlessness of youth, my steps wandered far from the paths of virtue, thy merciful goodness recalled me to a sense of duty.

In danger, and in distress, thou hast ever been my rock and my fortress; and hast often preserved me from the snares of vice, the most dangerous of all enemies.

When death hovered over me, and a morbid paleness was diffused over my countenance; thou didst re-kindle the almost expiring lamp of life; and when the recollection of my past sins embittered my soul, thy grace afforded me consolation and support.

Blessed be thy name, who hast loved me so well; who hast bestowed on me the sweets of friendship, and the ties of affection. Thou hast granted me the greatest blessing that the mind of man can conceive, for which this heart, entirely consecrated to thee, desires to exalt thee; the greatest good which can be enjoyed on earth, gracious God, thou hast given me; the permission to approach thy throne, to celebrate thy mercy, and to glorify thy adorable name.

In my fears and in my distresses, in my dangers and tribulations, I will confide in thy mercy alone; and supported by thee, death will lose all its terrors.

When the heavens shall pass away with a mighty noise, and the fabric of the universe be dissolved, I will rise above the ruins, and bless the omnipotent arm that upheld me, amid the crash of a wrecked world. O God, eternity itself is too short to utter all thy praise.

DECEMBER 11.

Era of the Creation of the World, and of the Human Race.

If we fix the epoch of the creation of the world, according to the testimony of the sacred writings, it has scarcely subsisted six thousand years. Those who suppose it to be of much more ancient date, are contradicted by reason, and the monuments of history which have escaped the dilapidations of time. The history of the human race does not go farther back than that which has been transmitted to us by Moses; for all else that has been said respecting the origin of ancient nations, has been advanced without proofs; neither does it extend beyond the deluge. As to the chronological books of the Chinese, they are evidently filled with falsities. The Phenicians have no historian more ancient than Sanchoniatho, who lived after Moses. The Egyptian history does not go beyond Ham, the son of Noah; and the books of the Jewish lawgiver remain to be the most ancient, as well as authentic, of all the monuments of antiquity.

If we consider the arts invented by men, we shall find that few of them have been known more than two or three thousand years. Man, whose nature and reason give him an apitude for the arts and sciences, is also stimulated to it by necessity, and the desire of obtaining conveniences and pleasures; and by his vanity and ambition, as well as by luxury, the child of abundance, which creates new wants. This has been evident amongst men in all ages. History informs us of the epoch when men had scarcely invented the most necessary arts; and when those which were known, were very imperfectly understood, and when they were ignorant of the first principles of the sciences. Four thousand years ago, men were in a great state of ignorance with respect to most subjects; and if we calculate the progress that they have made since that period, and then go back to the remotest ages, we may with some degree of certainty determine the epoch when men knew nothing, or in other words, that of the birth of the human race. If their existence was to be dated further back, it would have been impossible that the most useful and necessary arts should have remained unknown, during a long series of ages. On the contrary, all that the human mind was capable of discovering, would have been long since known; and from this circumstance, we must then necessarily conclude, that the origin of the human race could have had no other era than that assigned by Moses in his history of the creation. It is absurd to suppose, that men, during the space of so many thousand years, should have remained enveloped in darkness, and plunged in a lethargic stupor, from which they suddenly awoke, and all at once invented different arts, and procured for themselves all the comforts and pleasures of life.

It may be also remarked, that the greatest part of Europe was formerly covered by immense forests, very few cities, towns, or villages, then existing; consequently the number of its inhabitants must then have been much less than at present. Germany, for instance, was one continued forest, from which we may judge of the paucity of its inhabitants. Men, at first, could only cultivate the open spaces which were found in certain parts of the forests; they had no private property in land, and yearly changed their abode. In all Germany there was not a single fruit-tree; acorns alone were produced. If we wish to draw a parallel between the inhabitants of ancient and those of modern Germany, we must separate those which dwell in cities and towns; pay attention to the numerous colonies that have emigrated from Germany; observe that most of the forests being now cut down, and the space they occupied converted into arable land, ancient Germany would then be found to contain scarcely a tenth part of the cultivated ground that it now does; and, consequently, but a tenth part as many inhabitants. How many millions of men were there less at that period, than there are at present! And how abundantly must they have multiplied since! Yet the forests which extend from Germany to the north-east of Asia, and those still remaining in Africa and America, prove that our globe is not near so well peopled as it might be. The further we penetrate into the remote ages of antiquity, the less shall we find the earth peopled and cultivated, till we reach the epoch of the origin of the human race.

It is, therefore, impossible that our globe should have been eternal; for if it had, it must have been as well peopled from time immemorial, as it is at present.

DECEMBER III.

The Use of Wood.

THOUGH we derive very great and numerous advantages from every part of a tree, yet none of them can be compared to those which the wood itself affords us. Such is its abundance, that we might say, God provides us every day with a fresh supply, that we might never be destitute of so useful a substance. It answers every purpose for which we design it; is pliant enough to be susceptible of any form in which we mean to mould it; firm enough to retain any shape it has once received; and being easily sawed, polished, and bent, we procure from it many conveniences and ornaments. These, however, are far from being all the advantages which we derive from wood, as most of them only contribute to the purposes of convenience or luxury. We have more indispensable necessities, which we could not supply, if the wood did not possess a suitable degree of thickness and solidity. Nature, it is true, furnishes us with many hard compact substances; we have stones and marbles, which we know how to adapt to different purposes. But it is troublesome, as well as expensive, to extract these from their quarries, to carry them to a distance, and to work them; whilst with much less expense, and less trouble, we can procure the largest trees. Wooden piles, several feet long, forced into the earth, form a safe foundation for walls, which, without this precaution, would sink into the clay, or fall where the ground was sandy. They also support the most heavy and extensive buildings; and other pieces of wood sustain the stone-work, and the weight of the tiles, lead, &c. which compose the roofs of our houses.

Wood, in many provinces, is used as the chief article of fuel; and thus cheers the shivering natives in the long nights of winter, when the cold mists, and piercing north winds, would otherwise have chilled their blood. How necessary, then, is wood, as a part of the creation; and we now see that it was for the wisest purposes, that the Author of the universe covered so large a portion of the earth's surface with forests.

Whilst reflecting on the comfort and warmth which wood affords us at this season of the year, we may thus address ourselves to God: "Compassionate Father! this also is one of thy blessings; I receive it from thee with a lively sense of gratitude; and acknowledge thy providential care in providing for me the grateful warmth which cheers and invigorates my frozen limbs. Whether I endure the scorching days of summer, or feel the winter's piercing cold; in the open air, or in a warm apartment, thou art ever present, and ever my benefactor. Let me not forget thy mercies, nor regard even the fire-wood with indifference; but, as in each season of the year I receive peculiar marks of thy goodness, may I never cease to bless and to glorify thee, and exalt thy beneficence."

DECEMBER IV.

Remarkable Properties of certain Animals.

'We daily enjoy a variety of advantages which we derive from animals. The Creator has given us some that live domesticated with us, and others for our sustenance; and all, in one way or another, are designed to minister to our necessities and pleasures.'

The dog, independently of the beauty of his form, his strength, speed, and vivacity, has all those qualities which endear him to man. He possesses great sensibility, is much improved by education, and is every way worthy of our affection and regard. He knows how to promote our designs, watch for our safety, defend and caress us by turns, and by his assiduous services, and generous disposition, renders himself highly useful and agreeable to his master. Without the assistance of this faithful servant, we could not so easily subjugate other animals. In short, it seems as if God had given the dog to man for a companion and a guard. This very interesting animal merits still further attention from his performing many actions, which proves that he is not merely a machine, but possesses some principle of intelligence. How expressive are the signs by which he manifests the joy he feels upon his master's return! And how different again are those that he discovers upon the approach of a thief or an enemy, or when in full cry he pursues the hare, as she bounds over the plains.

The advantages which we derive from the sheep are still more considerable, though it has not the gift of pleasing like the dog. Every part of the sheep is useful to us; its milk, wool, flesh, and even its bones. A singular property observable in this animal is, that of its chewing the cud, or ruminating: it at first swallows its food hastily, without sufficiently masticating it; and afterwards can again bring it into its mouth, re-chew, and swallow it a second time. This animal has but one row of teeth, which defect, however, is remedied by its having four stomachs. In the first of these, which is called the paunch, and is very large, the food is softened and moistened; in the second, named the cap, or hood, and which is much smaller, the food is further macerated, and digestion begins to make some progress; from this it passes into the third stomach, called the millet, where it is retained till it is sufficiently dissolved; and digestion is finally perfected in the fourth stomach, called the rennet-bag, in which the food changes its colour, and becomes white like milk, though in the third stomach it was green.

The hare possesses instinct for its own preservation, and sagacity to enable it to escape from its enemies; it makes its own form or bed, and in winter chooses those places which have a southern aspect, while in summer it prefers the north. It conceals itself in furrows, or by the side of hillocks, that nearly resemble the colour of its skin. When pursued by dogs, it darts rapidly forwards, then turns and returns upon its steps, throws itself into some secret place, and after many leaps and doublings, hides itself in the trunk of a tree, or in some bush. It is cunning enough continually to change its place of abode as circumstances may urge.

The stag is still more wily and subtle than the hare, and often leads the huntsmen a much more arduous chase. The lightness and elegance of its slender and well-proportioned form; its branching horns, serving both for ornament and defence; its size, speed, and strength, distinguish it from all the inhabitants of the woods, the solitude of which it seems formed to embellish and to enliven.

When we reflect on these and innumerable other animals, we find more and more cause to acknowledge the goodness with which the Almighty provides for our support, our convenience, and our pleasures. Our globe is the habitation of innumerable animals, which are under our command, and exist for our comfort and sustenance. And if the soil of the earth is so diversified, it is only that a great number of animated beings may find there provisions adapted to their different natures. All kinds of soil, good as well as bad, sandy or marshy, stony or moist, from the banks of rivers to the summits of mountains, are peopled with living creatures, which in one shape or another are indispensable to us. There is no place, however sterile it may appear, that does not support some species of animals that are useful to us. And shall not man, thus indebted to the Father of mercy, acknowledge his goodness, and be grateful for his favours? Can he remain insensible to the many blessings he daily receives, or pass over with inattention those gifts of nature which he enjoys?

DECEMBER V.

Formation of Snow.

Snow is a species of hoar-frost; it differs, however, in this particular, that the hoar-frost falls in the form of dew upon the surface of certain cold bodies which attracts its moisture, and to which it adheres; whilst the snow, before it falls, is already formed in the upper region of the atmosphere by congealed vapours, which observe the same laws in falling as fogs, dew, and rain. The air is often very cold, and this may be increased to a considerable degree by the density of the atmosphere, and the accession of acid vapours. It is then very easy to understand how the aqueous particles become congealed. What, perhaps, contributes the most to give freezing property to the air, are the clouds; and generally every snowy day is also cloudy; and the thicker the clouds are, the more they interrupt the rays of the sun, and prevent their action; whence must naturally result a degree of cold great enough to make the vapours lose their fluidity, and convert them into snow. But, upon the same principle, ought it not sometimes to snow in summer? No doubt this may happen, and snow may really be formed in the superior regions of the atmosphere; but the cold in that season is never sufficiently strong to counterbalance the effects of the heat reflected from the earth, which melts the congealed vapours as they approach the lower regions of the atmosphere; consequently they cannot then appear in the *form* of snow. This is far from being the case in winter; as it is then so cold in the lower regions of the atmosphere, and upon the surface of the earth, that the frozen vapours in falling can no longer receive a sufficient degree of heat to melt them.

It is a pleasing sight to contemplate the flakes of snow as they fall; in a few moments covering the whole surface of the earth, far as the eye can reach; and it admirably justifies what was said by the pious Brookes, when he told us that "even snow has its charms, and winter its sweets. Pure and innocent pleasures may be enjoyed by all men, except those who from want of cultivating their faculties, are become incapable of reflection, and never regard the works of God."

DECEMBER VI.

Winter Plants.

It is wrong to suppose, that winter is generally destructive to plants and trees. So far from it, there can be no doubt that the variations of temperature contribute materially to the growth and propagation of vegetables. In very warm climates, there are immense deserts, that would be much more sterile if cold did not sometimes succeed to the burning heats. And winter, far from being prejudicial to the earth's fertility, promotes it. There are plants which thrive in the coldest countries, notwithstanding the ice and snow. Many trees, as firs, pines, junipers, cedars, the larch, and the box, flourish in winter as in other seasons. House-leek, pepper-wort, sage, marjoram, thyme, lavender, and wormwood, with many similar plants, preserve their verdure during the winter. There are even some flowers that spring up under the snow. The single anemone, the hellebore, the winter hyacinth and narcissus, the snow-drop, and various species of mosses, flourish and are in flower during the cold. We are informed by botanists, that the plants of the frigid zone, being placed in green-houses, could not bear a higher degree of heat than thirty-eight degrees; whilst they can support so great a degree of cold, as to grow during the winter in Sweden, as well as most parts of France, Germany, and Russia, and the northern provinces of China. Vegetables which live in very cold climates cannot bear much heat, neither can those that grow on the tops of mountains. Rocks, and mountains capped with snow during the greatest part of the year, have yet plants peculiar to them. Many vegetables are found upon the rocks of Lapland, which are known also to grow on the Alps and the Pyrenees; on Mount Olympus, and the heights of Spitzbergen, but are no where else to be met with. When these are transplanted into gardens, they grow to a considerable height, but bear very little fruit; and few of the plants which thrive in the northern countries will come to a state of perfection without snow.

Thus, in the immense garden of nature, there is no soil entirely barren, from the finest dust to the hardest rock; from the tropics to the frozen regions of the poles, there is no soil which does not produce plants peculiar to it; and no season is entirely destitute of these beautiful productions of nature; fruits or flowers continuing all the year round.

Grant, merciful Creator, that in this severe season, thy children may not forget thy paternal regard, nor shut their eyes to the blessings which thou hast graciously condescended to bestow upon them; and per-

[illegible]M'S REFLECTIONS.

mit, that, if thou art pleased to favour them with length of years, they may in the fulness of their days, and the maturity of their wisdom, bring forth fruit worthy of thee, and beneficial to their fellow-creatures.

DECEMBER VII.

Exhortation to remember the Poor during the Severity Winter.

You who now are sitting at your ease in comfortable apartments, cheered by the fire's genial warmth, whilst the north wind blusters round your dwellings, reflect upon those unfortunate children of poverty who are suffering the accumulated miseries of cold, penury, and disease. "Happy is the condition of those, who in this rigorous season, have a house to shelter them, and clothes to keep them warm; who are refreshed by wholesome food, and recreated by the juice of the vine; who reposing on downy pillows, enjoy sweet slumbers and pleasing dreams. But miserable is the lot of those to whom poverty denies a shelter; who have no home, no clothing to defend their shivering limbs from the rude blast; who are unable to make their necessities known, and have not a friend to cheer their drooping spirits, or sooth their afflicted souls, with the consoling language of hope."

I wish to awaken in the [illegible] f my readers, a sense of the miseries to which [illegible] est classes of society are subjected. I call up [illegible] s to regard those pitiable objects, whose nece [illegible] too importunate to be neglected, oblige them to intrude themselves upon the notice of the rich. How many poor creatures are seen feebly crawling along the streets, their countenances so haggard by woe, hunger, and cold, as scarcely to give the semblance of human nature! Men venerable in years, with scarcely rags sufficient to cover them, obliged to expose their hoary heads to the severity of the passing storm, whilst they humbly solicit the casual charity of the passenger! Others labouring under disease, destitute of sustenance and the commonest necessaries of life, stretched on some miserable pallet, in cellars or garrets, where damp, cold, dirt, and vermin, are their only companions; are lingering out their hapless moments in anguish, and hopeless dispair!

Winter, by increasing all the wants of the poor, renders our charity to them doubly necessary and indispensable. It is a time when nature herself is wild and destitute, and surely by distributing our benefactions seasonably, we very much enhance their value. If we have been enriched by the fruits of summer and autumn, is it not that we may be enabled to share these blessings with our less fortunate brethren, whilst nature is in a state of repose? As the cold increases, so should we be more disposed to administer unto the necessitous, and pour into the bosom of the distressed and the needy, a portion of the comforts arising from our super-abundance; and the affluent ought particularly to be thankful to Divine Providence for having it in their power to imitate his blessed nature, by relieving the necessities of the poor; and what nobler end can be answered by the unequal division of fortune, than that of the wealthy feeling for and relieving the miseries of their less favoured brethren!

Let those, then, who enjoy the gifts of fortune, compassionate the sufferings of the poor; and learn that it is their duty, and noblest privilege, to feed, to clothe, to warm, and to console the distressed; to dissipate their heart-corroding cares, and snatch them from the cold embrace of death. Let those who taste the sweets of independence, and revel in the pleasures of luxury, impart a portion of their superfluous abundance; and let those whose resources are less exuberant still give a part, remembering, that there are few people who have any title to respectability of character, howe ever limited their income, who have it not in their power to do some good. Let us, then, enjoy that delightful gratification which the noble heart ever feels, the divine pleasure of relieving the wants of our brethren, of tempering to them the rigours of winter, and the keenness of adversity. Who can deny himself the consolation of raising a fellow-being from the bed of sickness and the depths of misery; which he may often effect with ease, by retrenching some unnecessary ornament in dress, or curtailing himself of some pleasurable extravagance. And what more grateful incense can be offered up at the shrine of virtue, than beneficence exerted on behalf of suffering humanity, by a victory over our passions, or retrenching some expense in luxury or vanity, in order to apply it for the good of the poor.

DECEMBER VIII.

Nature is a School for the Heart.

The study of nature, in every point of view, is profitable; and it may very properly be termed a school for the heart; since it clearly teaches us the duties we owe to God, to ourselves, and to our neighbours.

Can any thing inspire us with a deeper veneration for the Supreme Being than the consideration, that it is he who not only has formed the globe of the earth out of nothing, but who has suspended it in the vast regions of space with all the creatures which it contains; that it is his all-powerful hand that retains the sun in his orb, and the sea within its confines: and can we humble ourselves too much in the presence of a Being who has created all those numberless worlds which revolve around us! What diminutive creatures are we, compared with those immense globes! And how little does the earth and all its glory appear, when considered under this point of view! And do we not shudder at the very thought of offending that God whose boundless power is every where manifested, and who in an instant can wither all our boasted strength, and render nought our most brilliant enterprises.

The contemplation of nature is particularly conducive to inspire in us the emotions of love and of gratitude for its Divine Author. All nature loudly proclaims the consoling truth, that God is love. It was love that induced him to manifest his glory by the creation of the world, and communicating to other beings a portion of that felicity which he himself enjoys. For this purpose he created the universe, and an innumerable multitude of creatures, that all, from the first link to the last, from the arch-angel down to the lowest reptile that crawls in the dust, should experience, each according to its nature and capacity, the effects of divine goodness. Is there a single creature existing throughout the vast regions of created nature, which does not afford proofs of this heavenly truth? Man more especially displays its certainty and divine operation; inasmuch as the Creator has not only endowed him with reason, more eminently to enjoy the blessings he receives, but also to enable him to feel and acknowledge that love which is the source of all the favours he enjoys. The Creator has given him dominion over all animals, to convert them to his use and conveniences; and for him he has made the earth produce her fruits in abundance. And ought the many blessings which we daily receive, and without the continuance of which our existence must cease, ought not the disinterested love of that great Being, who can derive nothing from his creatures, and whose felicity is perfect; to affect our hearts in the tenderest manner, call forth all our gratitude, and engage us with irresistible energy to return the love of our beneficent Creator? The contemplation of the universe, and the perfections of God so clearly manifested, should naturally increase our confidence in his power and mercy. And how great ought our tranquillity to be, knowing that we are superintended and directed by a Being, the proofs of whose wisdom, power, and goodness, we have continually before us in every part of the creation. What, then, in the hour of trial, of difficulty, and of danger, shall discourage us from offering up our prayers to him who has stretched out the Heavens, and formed all living creatures.

Is it possible that base and selfish principles can actuate the heart of a man, who, in contemplating nature, every where discovers traces of the infinite beneficence of God, who does not propose less the felicity of every individual than the universal good of the whole creation? No one can, for a moment, reflect upon the ways of Providence without being sensibly touched by his goodness and tender cares for every living creature; and the heart which is not incited to imitate this universal benevolence, must be depraved and callous to a degree, that makes us shrink with horror at the thought of its ever existing in a human breast: Does not God make "his sun to rise on the evil, as on the good, and send his rain on the just, as on the unjust?" Let us, then, learn charity on that extensive and liberal scale, which knows no bounds but those which the Omnipotent has set to the human capacity! If we desire to imitate our heavenly Father, we must endeavour to raise in our bosoms a spark of that celestial love, whose cheering warmth diffuses its comforts wherever we go, and the more we impart of it to others, the brighter is its radiance, ever inextinguishable.

DECEMBER IX.

The Goodness of God manifested to Men, even in those Things which appear to be hurtful.

It is very usual for men to wish that they were not exposed to any evils. If they had the power of choosing, and could regulate at pleasure their condition in life, they would endeavour to obtain one that should be exempt from all manner of trouble and affliction. But, it is a question, whether we should be really happy, if nothing ever happened to disturb our repose and well-being; or, if the course of our lives was to continue in one uniform calm, unruffled by the vicissitudes of disagreeable occurrences! This question, upon the decision of which much of our tranquillity in this state of existence depends, is highly deserving our attention, taking care, at the same time, to avoid the delusions of self-love.

Should we really be happy if we were in this world to enjoy uninterrupted prosperity? I cannot think we should. Constant prosperity would soon become insipid, and disgust would convert our felicity into absolute misery. On the contrary, the evils we sometimes experience, enhance the value of our blessings, as colours are relieved by the contrast of shades. If no winter preceded, should we be more sensibly affected by the pleasures of spring? Without illness, could we justly appreciate the value of health; or, taste the sweets of repose, without toil and labour? And could we know to their full extent the peace and consolation of a good conscience, if we had never experienced the trials of temptation, or the pangs of remorse? The more obstacles there are to oppose our happiness, the greater is our joy when we have surmounted them. The more sensibly we feel the weight of misery and oppression, the greater is our happiness when we are delivered from our burden. Besides, if the misfortunes of which we so much complain did not sometimes befall us, we should be exposed to evils of much greater importance. If we lived in one continued round of prosperity, we should abandon ourselves to pride, luxury, and ambition. If we never knew the misery of dependance, and the wretchedness of want, we should have no stimulus to exertion, nothing to rouse us to action; no one would exercise his talents, or cultivate his faculties, and no one would be animated with zeal for the public good. If we were never exposed to danger, how could we learn prudence, or experience the sentiments of compassion for those whose life is in danger? If we had no misfortunes to fear, how liable should we be to forget, in the intoxication of prosperity, our gratitude to God, charity for our neighbour, and all the great duties of life? And are not these virtues and noble qualities of the soul, infinitely preferable to a continued succession of sensual pleasures, which, when they are no longer stimulating by their novelty, produce satiety and disgust? "He who continually reposes on the bosom of prosperity, soon becomes weary of exerting himself for the benefit of others, and incapable of any great action; but when adversity opens his eyes to his real state, he will return to wisdom, activity, and virtue."

How foolish and unjust are the desires of men! They wish to live quiet, content, and happy, and they are dissatisfied with the means which will conduct them to the haven of their desires. During the heat of summer we sigh for cool breezes, and yet are troubled when we see the storm that will procure them begin to threaten. Thunder purifies the air, and fertilizes the earth; and yet when it awfully rolls among the clouds, we complain of the fear that possesses our hearts. We acknowledge the utility of coals, sulphur, and minerals: but dislike earthquakes. We are desirous that there should be no contagious and epidemic disorders, and yet complain of the tempest which, by purifying the air from corruption, takes away one of the chief causes producing them. We wish to be served by domestics, and yet are unwilling that there should be in the world either poverty or inequality of rank. In short, we desire to have every end accomplished, without suffering the necessary means.

Acknowledge, then, O man, the wise and beneficent views of thy God, even when he permits thee to be tried by the frequent vicissitudes of joy and of sorrow, of happiness and of misery. Is he not the Arbiter of thy lot, the Father, of whose merciful goodness thou must be convinced even when suffering chastisement? Art thou not in a world, the peculiar characteristic of which is to be subject to continual changes and revolutions? And has thou not often found, that what thy ignorance disposed thee to regard as an evil, has in the end contributed to thy happiness? Let us, then, receive with humble resignation those afflictions which it shall please the Almighty to be dispensed unto us. They will only appear to be formidable in the beginning; the more we shall be exercised by them, the more supportable will they be, and the more shall we know their salutary effects. If in adversity we are full of faith, patience, and hope, we shall have cause in the end to bless God for his trial of our nature.

DECEMBER X.

Accidental Revolutions of our Globe.

Nature of herself is continually producing changes upon the surface of the earth, which have a great influence upon the whole globe. Many ancient monuments prove, that in different places the surface sinks down, at one time gradually, at another suddenly. The wall that the Romans built in Scotland in the seco[illegible] century, quite across the whole country, is now almost entirely buried underground, and remains of it are frequently discovered. Mountains, those pillars of the earth, are exposed to similar changes, occasioned either by the nature of the soil; by water [illegible]ping their foundations; or by subterranean fires. [illegible]ough some parts of the earth sink down, others on the contrary are elevated. A fertile valley may at the end of a century be converted into a marsh, where clay, turf, and other substances, may form strata from each other. Lakes and gulphs are converted into dry land. In stagnant waters, weeds, rushes, and different plants grow; substances, both animal and vegetable, putrify in them, and gradually form a sort of mud or mould, till at length the bottom becomes so much raised, that the place of the water is occupied by solid earth. The sea also partakes of the commotions, occasioned by earthquakes and explosions, and the most sensible effect we observe from them is the formation of new islands. These are produced by the elevation of the bottom of the sea; or are composed of pumice stones, calcined rocks, and other matters projected from volcanoes. History informs us, that in consequence of earthquakes whole cities have been swallowed up, and buried sixty feet deep, so that the earth which covered them afterwards became arable ground.

Many of the alterations produced upon our globe have been occasioned by the motion of waters. Rain soaks into the mountains, and washes away a portion of their substance, which being carried into the sea and rivers, considerably raise their bottom. The course of water is often changed; and the coasts themselves are sometimes removed. At one time the sea retires, and leaves whole countries dry, which once were its beds; and sometimes it encroaches upon the shore, and inundates whole provinces. Places which formerly bordered on the sea, are now at a considerable distance from it. Anchors, and large iron wrings to moor vessels, and the wrecks of ships, found on mountains and marshes, at a great distance from the sea, incontestibly prove, that many parts of the earth, now cultivated, were once covered by the ocean. It is a very probable conjecture that England was once united to France: the beds of earth and stone, which are the same on each side the strait between Dover and Calais, as well as the shallow-ness of the sea between those two places, render it still more likely to have been the case.

Climates also occasion great revolutions upon the globe. Between the tropics, heats and rains alternate; in some places it rains for several months successively, and at other times the heat is excessive. The countries situated near the poles are exposed to great changes by the rigour of the cold. In autumn, the water penetrates by numerous crevices into the rocks and mountains: and in winter freezes, when the ice, by its dilating, causes great destruction.

Hence, we learn, that all mundane things are subject to change, and continual vicissitudes: and we see, that frequent accidental revolutions give place to cause the animate, as well as the inanimate world, to assume a new appearance. One generation departs to give place to another. Amongst men, some rise into notice and respectability, whilst others sink into poverty and insignificance; and amongst the various creatures that inhabit the globe, there are evident differences in their states and faculties. God has allotted to all beings different periods of duration; some have only a short and momentary existence, others a long life, and others an endless duration; all evincing in the most striking manner, the wisdom, power, and goodness of the Creator.

DECEMBER XI.

Gratitude for our Clothing.

PROVIDENCE manifests his care even in our clothing. How many animals furnish us a covering, with their skin, hair, furs, and wool! The sheep alone supplies us with the most necessary part of our dress; and to the labour of a worm we are indebted for our silken robes. How numerous are the plants which also contribute to our dress! Flax and hemp also supply us with linen; and with cotton various articles of apparel are manufactured. But these vast stores of nature would still have been deficient, if God had not endowed man with industry, and a mind inexhaustibly fertile in invention; as well as hands suitable to prepare the different kinds of clothing that are necessary. If we only reflect upon the labour requisite to prepare a single piece of cloth, we shall find how many hands are necessary to procure even a few yards. We surely ought not to be vain of our garments, seeing that to obtain them we are obliged to have recourse to those animals that are the most contemptible in our estimation, and to that class of men that we the most despise.

Why has the Creator obliged us to provide ourselves with clothes, whilst all other animals receive theirs immediately from nature? In answer to this, I assert, that this necessity is very advantageous to us; it is favourable to our health, and suitable to our mode of living. We may by this means regulate our dress according to the season of the year, and the climate in which we live. Our clothes promote the insensible perspiration of our bodies, so essential to the preservation of our lives; and the obligation that we are under of procuring them, has exercised the human mind, and given rise to several arts; and, finally, the labour which they require for their fabrication, supports a great number of workmen. We have, therefore, every reason to be satisfied with this arrangement of Providence; only let us be very careful not to lose sight of the end proposed in our being supplied with clothing. A Christian certainly should not seek to derive his glory from the external covering of his body; but in the virtuous dispositions of his soul. Pride assumes various forms; it is elated by the most trifling advantages, and seeks for applause where none is merited. Pride is manifested by some people in the brilliancy of their silks, and the splendour of their jewels, whilst others nourish it in rags. The man who studies propriety will avoid either extreme. To glory in outward ornament and external pomp, is degrading to our nature; we wear clothes to preserve us against the intemperance of the air, and not to gratify the pettiness of vanity and the insignificance of pride.

Let us also reflect a little on the state of many of our fellow creatures, who have scarcely clothes to cover them. How many poor wretches do we see around us half-starved and half-naked; who in these severe winter days can find no shelter from the cold! Let the contemplation of these unfortunate beings induce us to feel a lively sense of the Divine Goodness which has enabled us to obtain the necessary clothing. Let us, then, remember, that many people are destitute of what we so abundantly enjoy, and that it is our duty to clothe the naked, to feed the hungry, and be grateful to God for the plenty with which he has blessed us.

DECEMBER XII.,

Covering of Animals.

IT is an incontestible proof of Divine Providence, that all animals are naturally provided with that covering which is best adapted to their place of abode, and mode of living. Some are clothed with hair, some with feathers, several with scales, and others with shells. This variety is a certain proof that a very skilful workman has prepared the garments of these animals; for they are not only generally adapted to the different species, but also appropriate to each particular individual. For quadrupeds, hair was the most suitable covering; and nature in giving it to them has so formed the texture of their skin, that they are hardy enough to lie down upon the ground in all kinds of weather, and be employed in the service of man. The thick fur of some animals, whilst it secures them against the effects of cold and moisture, serves them also to cover their little ones, and to lie down more softly.

For birds and some species of insects, feathers form the most convenient covering; besides sheltering them from cold and wet, they are so arranged as to enable them to float more easily upon the air. Feathers cover the whole body of the bird, and by their delicate structure favour its flight; they are light and hollow, and their quill contains a marrowy substance which strengthens them; while capillary filaments, interlaced into each other with much art, render them sufficiently thick to maintain the heat of the body, to preserve it from the inclemency of the weather, and to give the wings a sufficient degree of strength.

The covering of reptiles is also perfectly adapted to their mode of life. Let us examine, for instance, an earth-worm. Its body is formed of a series of small rings, and each ring is provided with a certain number of muscles, by means of which it can extend or contract its body at pleasure. They have under their skin a glutinous juice which exudes, and whose effect is to lubricate the body, that it may with greater facility make its way in the earth.

Aquatic animals are covered by a substance equally well adapted to the element in which they live. Fish could have no dress so convenient to them as scales; the shape, hardness, size, number, and position of which are admirably adapted to their mode of life.

The beauty of these various kinds of covering is also very remarkable; particularly in some species of birds and insects. The varied hues of the butterfly, and the splendid plumage of some birds, are truly admirable; in some we see all the richness of colouring, in others the most beautiful and delicate simplicity. The humming bird, a native of America, may be justly regarded as one of the wonders of nature; not larger than a bee, its plumage is so beautiful, that its neck and wings reflect the brilliancy of the rainbow. Its neck exhibits the bright red of the ruby; under the belly and wings the colour is that of gold; the thighs are green as the emerald; the feet and bill, black and polished as ebony. The males have a small tuft upon their heads uniting all the colours that adorn the rest of their body; and which the Mexican ladies wear as pendants in their ears.

We find, then, that every animal has that kind of dress which is most suitable to it; nothing is defective, nothing is superfluous; but every thing is so well arranged and perfected, even in the smallest productions of nature, that human industry and art can never imitate it. And does not this clearly demonstrate the existence of a Being, who unites infinite wisdom and goodness, to a desire of rendering each creature as happy as its nature and distination will permit.

DECEMBER XIII.

Thoughts on the Ravages of Winter.

I HEAR the wind and the tempest roar. The blood freezes in my veins. The gathering gloom, the fearful misgivings of my heart, concur to render the awful tumult of nature more terrible. How often does the wind sweep down cottages and palaces, and in a moment destroy the labour of years! How often are ships, and the unfortunate men who hazard their lives in a brittle bark, plunged into the dread abyss! And how often are the sturdy oaks torn up by the roots! But thou, O Lord, art the Creator and the Ruler of the storm. The tempests and the winds are thy messengers, the heralds of thy power, and the ministers of thy will. They should lead us to fear and to adore thee. Didst thou not set limits to their destructive power, they continually, and in all places, would cause the same ravages; yet, thanks to that wisdom which stills the winds, the lowly cottage is still preserved, though unsheltered from the rude blast of the storm.

If the creation, and all mundane events, are the works and effects of Infinite Wisdom, how can the disorder, dissolution, and destruction, occasioned by tempests, ever happen? Can Almighty Intelligence produce any thing but order? Or can Supreme Goodness design any other end than what is good? Thus, thy thoughts wander, O man; but what art thou that thus interrogatest thy Creator? Shall man say unto his God, why hast thou thus created me?. And because we cannot explain the mysteries of nature, shall we say that the works of Providence are defective? To judge of his works, aud of the ends which he has proposed, would require an intelligence and wisdom equal to his own. It is, indeed, wonderful, that we are capable of perceiving a part of the order which he has established, of embracing a part of the wise and immense plan which he has executed, and that considering the darkness of our understanding, things are not still more confused than they are.

To make a whole of the materials which compose the visible world, where so many superb phenomena are produced, so many beauties displayed, and the treasures of reason, virtue, and felicity, abundantly enjoyed by myriads of living creatures; is a work so vast and wonderful, that it could alone be effected by a Being all-powerful, wise, and good. The further our researches penetrate into the works of nature, the more the goodness and wisdom,* which has created all, and governs all, is manifested.

After these considerations, we shall form a different opinion respecting the ravages of winter. The tempests, the frost and the snow, and all the phenomena peculiar to this season, which can be considered as disagreeable, are linked together in the eternal order of things: each having its season, and appointed time, and all contributing to the general harmony of the universe. The wind that affrights the mariner upon the ocean, drives water upon dry lands. The sulphurous vapours, salt, and other matters carried by the wind from one country to another, revive the earth, and restore fertility to the fields which had been exhausted by their frequent crops. Thus, winter, apparently so destructive, enables our meadows again to yield us rich fruit. The fields, the gardens, and the seeds now repose beneath ice and snow. All nature appears dead. But God, during his apparent suspension of vitality preserves the world and watches our suffering nature. He feeds and supports the poor, and even neglects not the starved shivering birds, for whom he provides places of retreat.

"Lord, thou art great! In the most tempestuous seasons thou art merciful and compassionate. From amid the ice and the snow thou preparest food for us; and thou enabledst us to bear the severity of the cold. Thou clothest the naked, thou strengthenest the weak, they live and are prosperous. Teach us to know thee, and to acknowledge thee as our friend and our benefactor. Cause thy goodness to kindle a holy rapture in our hearts; to breath in us such love that we can feel kindness for our enemy, clothe him when naked, feed him when hungry, and wipe away his tears when in distress! When, for thy sake, the poor man shares his morsel with him who is destitute; condescend to reward his labour of love. While time shall endure, winter and summer, seed-sime and harvest, shall succeed each other, and thy blessings shall cover thy creation."

DECEMBER XIV.

Sagacity of Animals in procuring Sustenance for the Winter.

THERE are some animals which, during the harvest time, lay up stores for the winter, containing provisions for six months. Thus appearing to foresee that a season would come, in which they could not obtain their accustomed food, and that provident of the future, they know how to calculate the quantity of provisions that will suffice for both them and their families. Amongst insects, bees are almost the only species that lay up provisions for the winter. They use their wax with great economy, because they cannot gather any more when the season of flowers is passed, and when they have no other means of subsisting, and constructing their cells, than the stores they have previously secured. They have also the sagacity to collect another sort of matter, which is necessary to secure their hives from the effects of cold; and this is a sort of glue that they obtain from flowers and bitter plants, and with which they closely stop up every crevice in their hives. They waste nothing, observing the strictest economy, and what they do not at present want, they reserve for future occasions. We are even informed by those who have carefully observed their habits, that when in winter they uncover the cells that contain the honey, they lay by the wax which closed them for future use.

Amongst quadrupeds, the hamster and the field-mouse lay up provisions for winter, and during the time of harvest, convey a quantity of grain into their subterranean dwellings. Among birds, magpies and jays collect acorns during the autumn, and preserve them for the winter in hollow trees.

These provident cares of animals cannot be the result of reflection, for that supposes much more intelligence than they are capable of. They only think of the present, and of what affects their senses either agreeably or disagreeably. And if it happens that the present has any reference to the future, it is without design on their part, and without their having any knowledge of what they do. Indeed, it is difficult to imagine how foresight and reflection should enter into the instinct of these animals, since they have no idea of the vicissitudes of the seasons, and the nature of winter; and having no conception of the measure of time, they neither know when winter will arrive, nor how long it will continue. It would be equally absurd to attribute to them reason, ideas of the future, or any reflection upon the means of existence during the severity of the season, since they always act without any variation, and each species constantly follows the same method as its predecessors, without any instruction: When the bees, then, do not cease to collect wax and honey till they have filled their magazines, or until the season no longer permits them to work, it is not because they foresee that a time will come when they can collect no more: such a degree of foresight ought not to be attributed to them. They are instigated by nature to collect wax and honey, to work during the fine seasons, and by the time winter arrives, they have generally filled their magazines. These, as well as all other animals, act without reflection or design, almost mechanically, although they seem to follow the wisest rules that could have been dictated. Being, therefore, destitute of reason, that wise economy, and those apparent acts of foresight and reflection which we observe in them, must be produced by a superior intelligence which has thought and taken care for them, and whose views they fulfil without knowing it. And herein consists a part of the prerogatives which men enjoy over brutes. We can recall the past, and imagine the future, act from reflection, and form plans, determine from motives, and choose what is suitable. How important it is, then, that we should make a right use of these prerogatives! Informed, as we are, of the great revolutions that await us, and being able to anticipate the winter of our lives, how incumbent it is upon us to prepare a rich stock of knowledge and virtue, which as we decline in the vale of years, shall smooth our path into eternity, and gild our last moments with the rays of joy and of peace.

DECEMBER XV.

Advantages of Winter.

It is advantageous frequently to reflect upon the blessings which God grants to us in this rigorous season. In consequence of the cold and frost, many noxious vapours are retained in the superior regions of the atmosphere, by which means the air is rendered more pure. Far from being prejudicial to the health of man, they often improve it, and counteract that debility which a continued heat would produce. If all the vapours and exhalations which are collected in the atmosphere were to descend in the form of rain, the earth would become too soft and wet, the roads would be impassible and our bodies would be subjected to various diseases. In hot countries, and in those where there is much wet during the winter, dangerous and severe diseases are much more frequent than in other places. Travellers inform us, that in Greenland, where mountains of ice are very common, and where in winter the days are scarcely four or five hours long, the air is very salubrious, pure, and light, and that, except some complaints in the chest and eyes, occasioned partly by the nature of the food, the diseases most common in Europe are rarely met with. And it is also certain, that the constitution of the human body varies according to the climate in which it is placed, so that the inhabitants of the northern countries enjoy a constitution adapted to the excessive cold that prevails there, and they are generally very robust and hardy. Even as man, though he loves to be in action, and that labour is necessary to him, is yet glad to have his toil interrupted by the recurrence of each evening, to taste the sweets of sleep, and to pass into a state altogether opposite to that in which he was when awake, so also does our nature accommodate itself to the vicissitudes of the seasons, and we are pleased with them, because they contribute to our happiness and well-being

At present our fields and gardens are covered with snow, which is necessary to preserve them from being injured by the cold, to secure the seeds from the impetuosity of the winds, and to prevent their being destroyed. The fields, after having, during the fine weather, produced all the fruits upon which we live in the winter, require some repose. And in this we have great cause to acknowledge the wisdom and goodness of God; for if he had not provided for our support, and if to obtain our nourishment we were obliged to cultivate the earth in this rigorous season, our complaints might have some foundation; but he has begun by filling our magazines which are sufficient to supply all our wants, and permit us to enjoy a degree of repose suitable to the seasons.

How tender are the cares of Providence for us during the winter? He has given to men that industry of which they have so much need to fortify themselves against the attacks of cold and frost. Their inventive mind has made them find the means for procuring for themselves an artificial heat, by means of which they can enjoy in their own apartments a degree of warmth equal to that of summer. The cares of Providence are not less evident in the annual production of wood and its astonishing multiplication than in the fertility of our fields. Besides, we have many animals at our command which are very useful in enabling us to support the severity of the season. The colder the country, the more useful are those animals whose furs are designed to keep us warm. And is it not evident that Divine Wisdom has foreseen the wants incident to different climates, when he has placed in them animals that could live no where else?

Winter does not materially interrupt trade or commerce. For though the rivers may have lost their fluidity, their surface, solid as a rock, is converted into a high-road where carriages may pass in safety. Though we are obliged to suspend the labours of the field, there are various other ways in which we may be usefully employed; and we are never condemned to a state of idleness and inaction. The repose of nature invites us to look for resources in our own minds: and though our imagination cannot now be warmed with the beauties of nature in their spring and summer robes, our mind, no longer attracted by external charms, will be at leisure to look back, and dwell upon the images it has formerly perceived and made its own; or it may from the present change in nature be led to reflect upon the instability of all earthly things, and prepare to enter into that eternity to which it is hastening, and devote itself with full sincerity to the service of that Supreme Being who never changes, but is ever the same, merciful, just, and omnipotent.

DECEMBER XVI.

The Elements.

WHETHER we consider the universe collectively, or examine its different parts in particular, we shall always find sufficient cause to admire the wisdom and goodness of the Creator. It is true, that we have a very imperfect knowledge of things; and that in most instances we can scarcely advance beyond conjecture and probability. But this is enough to make us acknowledge, on the one hand, the grandeur of God, and, on the other, the weakness of our reason. Perhaps all the elements are of the same nature, and may be reduced to a single essence; so combined as to form but one whole. As it would be very difficult for us to consider the elements as a whole; it is necessary to divide them, and separately consider the primitive constituent parts of bodies.

How various and admirable are the properties of the air which we every moment respire! How great is the force with which it divides and dissolves all kinds of substances, at the same time imbibing their different qualities! Innumerable vapours and exhalations; thousands of various odours; volatile salts, alkalies, and acids; oils and inflammable spirits, that all mix and unite with it, sometimes rendering it noxious, though generally salubrious and beneficial. These foreign particles contained in the air; its elasticity, the property that it has of becoming rarefied or condensed, and of regaining its natural state, produce those agitations in the atmosphere, those meteors, that disperse the noxious vapours, purify the air, and favour the vegetation of plants. And though the effects of the air are sometimes severe, they are nevertheless necessary, to prevent the earth being converted into a desert. There are in this element, as in all the works of God, impenetrable mysteries. Who, for instance, can explain how the particles of air being so subtle as entirely to escape our sight, are yet the means by which objects become visible to us? How wonderful is the equilibrium that obtains between the external air and that which is within our bodies! A balance upon which our health and even life depends! And how admirable is it, that the same element should be the medium by which sound, odours, and light are transmitted.

Water has some conformity with air, and its properties and effects are not less various and admirable. All the abundance and salubrity of the air, all the riches of the earth, and the heat of the fire, could not prevent our perishing if we wanted water. Of how many changes and combinations is it not susceptible! Who has given it the property of dilating, dividing, and rarefying, to such a degree, as to enable it to ascend in the atmosphere to the height of a league, float there, and form itself into fogs and clouds? Who has given it the power of penetrating into plants, of again passing out by their insensible pores, and of diffusing itself over our fields and valleys in the form of dew? How astonishing is the property it has of sometimes becoming lighter than air, though a given quantity of water is nine hundred times heavier than a similar quantity of air; of attaching itself to all kinds of bodies, of dissolving the most compact substances, and of even uniting with fire.

Of all the elements, we know the least of the nature of fire. It is too subtle for our eyes; though its virties, properties, and effects, are sufficiently obvious. Whether the essence of fire consists only in motion, or in the fermentation of inflammable particles; or, what several experiments would seem to authorise us to suspect, that it is a simple matter, differing in its nature from all other corporeal things; it is certain that its prodigious abundance, its utility and wonderful effects, deserve all our attention. There is no body so cold, that does not possess particles capable of ignition The presence of fire is universal; it exists in the air which we respire, in the water that we drink, and in the earth upon which we live. It enters into the composition of all bodies, it passes through the minutest pores, unites itself closely to them, and moves with them from one place to another; and however covered and confined, it does not fail to discover itself. How forcibly it dilates the air which surrounds it, whilst the air itself renders the fire more active! It gives fluidity to the water, fertility to the earth, and health and life to man and animals.

Earth, when pure, is distinguished from all other bodies by its having neither taste nor smell; by being insoluble in water and spirits of wine, and by its friability. It at first appears to be very different from all the other elements; and yet has so much conformity with them, that some naturalists believe that water is nothing more than earth in a state of solution; and that earth is water in a condensed state. According to these, the water upon our globe is continually diminishing, and gradually forming compact substances, and that our planet formerly was only a fluid mass, and at a still more remote period, only water.

All these different elements are essential to our existence and preservation, and whenever we reflect upon their wonderful properties, and the numerous and diversified effects which they produce, our admiration must be called forth. With how many properties, all differing from each other, has God endued his works!

How many agents in the heavens and upon the earth, are continually in motion for the preservation of the universe, and each individual in particular! What wonderful revolutions and phenomena are effected by the elements alone! It would be more easy to number all the works of God than to calculate the multiplied forces which are in action! How great, then, is the power of that Being, in whose hands are all the elements, and all the different agents in nature; who directs them all to the greatest and most noble ends; unto whom be rendered honour, glory, and praise, for ever and ever.

DECEMBER XVII.

Influence of the Sun upon the Earth.

THE sun is a very powerful agent in the system of this universe. He is the constant source of the light that is so abundantly diffused over our globe. This light of the sun is the most subtle fire: it penetrates all bodies, and when it is in sufficient quantity, puts all their parts in motion, attenuates and de-composes them, dissolves those that are compact, rarefies those which are fluid, and adapts them to an infinity of motions. Is it not evident, then, that from these diversified effects of the sun upon bodies, must depend most of the phenomena and revolutions of the globe? When the force of the sun's light increases, that is, when the rays fall less obliquely, and in greater quantity upon a given place, and when they continue each day to act longer, which is the case in summer, it must necessarily effect great changes, both in the atmosphere and upon the surface of the earth. And when the rays fall more obliquely, and consequently more feebly, and the days are shorter, and their action is less prolonged, as is the case in winter, how different are the changes observable in the atmosphere! How gradually we perceive the alterations, when from the remote sign of

Capricorn, the sun advances near to the equinoctial line, till by the time of the spring, the days are equal to the nights. And what new phenomena are seen, when this luminous body returns in summer from the tropic of Cancer towards the line, till the days and nights again become equal in autumn, and the sun removes from our zenith!

It is chiefly on the distance of the sun from the earth, that all the diversity observed in the vegetation of plants, and in the internal constitution of bodies in all climates and seasons, depends. Hence, each climate and season has plants and animals that are peculiar to it, and the progress of vegetation is more or less rapid, and the productions of nature continue a longer or shorter space of time.

It is impossible, however, to describe, or even point out all the various effects of the sun upon the earth. All the changes and revolutions of the globe are principally owing to the action of this luminary, because upon it chiefly depend the different degrees of heat and cold. And it requires but a slight share of attention to be convinced of the numerous and sensible effects of which the sun is the prime cause. At one time he rarefies, at another condenses the air, one while raises vapours and fogs, at another precipitates them down in the form of rain, or different meteors. He causes the sap to rise in vegetables and trees, which makes the leaves and blossoms shoot, and ripens the fruit. He animates all nature; and is the source of that vivifying heat which gives to organized bodies their powers of developing, of growth, and of perfecting themselves; there is no place where his influence is not felt; it penetrates the rocks, and the mountains, and extends to the depth of the sea. This alone is sufficient to convince us of the power of our Creator; and if we consider with what art and wisdom God has drawn a multitude of great effects from one and the same instrument, and made use of the sun's heat to produce so many phenomena of nature, we should more and more clearly perceive his Omniscience, nothing short of which could have effected so many wonders.

DECEMBER XVIII.

Winter Rains.

WHAT a difference there is between the effects of the rains which now fall, accompanied with cold and dreariness, and those of the refreshing rains of summer! This change gives a sorrowful aspect to nature. The sun is veiled, and the whole heaven appears to be one vast cloud. We cannot see far; a gloomy obscurity hangs over us, and we are threatened by the gathering tempest. At length the heavy clouds break, and the earth is inundated, the air seems an inexhaustible reservoir of water; the rivers and brooks swell, and overflowing their banks, sweep over the distant fields and meadows.

However disagreeable and unpleasant such weather may appear to us, we must still acknowledge that it is ultimately for our good. The earth, almost exhausted by its fruitfulness, requires a renovation of its strength; to acomplish which, it is not only necessary that it should repose, but also that it should be moistened. Rain waters and refreshes the dry land, soaks into it, and penetrates the lowest roots of plants. The dry leaves that cover the earth, rot and form an excellent manure. The abundant rains of winter fill the rivers, and supply the springs and fountains with water. Nature is never idle, but is continually working, though her activity is not always apparent. The clouds, by continually pouring down snow or rain, prepare the fertility of the ensuing year, and the riches of summer. And when the heat of the sun brings back the dry season, the abundant springs which the winter rains had formed, diffuse their waters, irrigate the meadows and the valleys, and adorn them with new verdure.

Thus, the wise Creator provides for the future, and that which appeared to us destructive and inconvenient, becomes the source of all the beauties and riches which in spring and summer are lavished in such profusion. The gifts that we thus receive are more innumerable than the drops of rain that fall from the clouds; and at the very time when man, ignorant and blind, is murmuring and complaining, he ought to be singing songs of joy, for eternal immutable wisdom is then continuing to fulfil its beneficent designs. Our preservation, then, is the principal end that God proposes in sending rain upon the earth. And the Divine Wisdom knows how to combine various designs together, and from their happy combination results the order and harmony of the universe.

As the earth is benefited by the visitation of the tempest, and prepared for fertility by the repose and gloom of winter; so is man improved by adversity. To bring forth good works, it is not meet that the sun of prosperity should always bless us with his rays. From the nature of our constitution, and the design of our being, we must suffer trials, and occasionally experience disappointment and affliction. Let us, then, receive adversity from the hand of God with resignation, under the firm conviction that all his dispensations are ordered by unerring wisdom and infinite goodness.

DECEMBER XIX.

Supposed Influence of the Planets and Fixed Stars.

THE prodigious distance of the heavenly bodies, and the little connexion that our globe has with them, scarcely renders it probable that they should have much influence upon it. Yet many superstitious people believe in such an influence, and affirm that there are continual emanations passing from the stars and planets which act upon our atmosphere and terrestrial bodies. But what are these emanations? If by them is meant the proper light of the stars, or the light of the sun reflected from the planets; that will be found to be very little, much less than what proceeds from the moon alone. And as the light that we receive from the moon, has no sensible influence upon the earth or upon the atmosphere, surely that which we receive from the planets and fixed stars, at a distance so much greater, cannot affect our globe. And the supposition that other matters, emanating from these stars, affect us, is equally void of foundation. For if these emanations were really to take place, upon being collected in the focus of a burning-glass they would produce some evident change in terrestrial bodies; but this is contradicted by experience. It seems, then, that nothing is emitted from the heavenly bodies, but the light which they send us: or if any other emanations do proceed from them, they must be of such a nature as to pass through terrestrial bodies without effecting in them any sensible change, or the least derangement in their particles. Thus, those astrologers, who either deceive themselves or wish to impose upon others, deserve the utmost contempt, when they tell us of the benign influence of Jupiter; the malignancy of Saturn; the wit-inspiring Mercury; the war-rousing Mars; and the amorous influence of Venus.

Planets not only cannot singly produce the peculiar effect that astrologers attribute to them, but even taken collectively cannot have any influence. What shall we say of the rain-bringing Pleiades, the stormy Orion, the melancholy Hyades, the setting of Arcturus, and the rising of Capricorn, portending hail and tempests? What influence can the constellation Taurus have upon pease and beans, and that of the star Sirius upon mad dogs? Or what relation can Scorpio have with the harvests and produce of the fields? If the rising and setting of the different constellations were observed only as they denote the proper period for the different labours of agriculture, and not as the causes of natural things, it would be excusable. In the first ages of the world, the beginning, middle, and end of each season were not marked by the names of months, but by the rising and setting of the stars in conjunction with the sun, or by their immersion in, and emersion from his rays. Hence the vulgar opinion, that the different aspects of these stars produced effects that in reality should be attributed to the seasons, and of course to the sun. Orion rises in autumn, and sets in winter: hence he is said to occasion tempests. When the dog-star rises with the sun, it is extremely hot in our zone; but this constellation is not the cause of the heat, which is occasioned by our sun being then at its greatest elevation; and in the opposite zone, when the dog star rises with the sun, it is altogether as cold. So that the inhabitants of the southern countries, far from considering the dog-star as the cause of heat, regard it as the cause of cold. The same may be said of the Pleiades, which are supposed to bring rain; and of all the constellations to which effects are attributed that really belong to the seasons in which these stars rise or set.

If, then, the planets and fixed stars have no part in the temperature and natural dispositions of our globe, they must have still less influence upon human actions. The happiness and the misery of individuals, and of whole nations, partly depend upon their natural talents and passions, and in part upon the political constitution of states, and upon the combination of certain natural and moral causes. Consequently the stars can have no influence whatever upon these, and if they had, we should have some reason to doubt the empire of Providence, and to disbelieve in the agency of a Being infinitely wise, good, powerful, and just. Leaving, then, to the superstitious a science so inimical to our repose, and so humiliating to the human mind, a jargonistic cant, disgracing the name of science, called by its advocates judicial astrology, and which in fact is nothing more than a miserable abuse of astronomy in the hands of knaves and of imposters; or of weak and foolish people; let us look up to our wise and merciful Parent, as the only true foundation on which to rest the certainty of our present peace and eternal happiness.

DECEMBER XX.

The Polar Star.

THE most remarkable among the northern constellations, is that which is nearest to the north pole, and termed the little bear. The last star of its tail is but two degrees from the pole, hence it is called the polar star. It is easily distinguished from the neighbouring stars, because it scarcely appears to change its position, and is always in the same part of the heavens. For though it revolves round the pole, its motion is so slow, and the circle that it describes so small, as to be scarcely perceptible. By this apparent fixity of situation, it becomes a guide to travellers, and particularly to mariners who are sailing on the open seas. Before the discovery of the compass, sailors had no surer guide than the polar star; and even now, when the sky is serene, they repose in many cases with greater certainty upon the direction of this star, than upon the magnetic needle.

The advantages which we derive from the polar star, naturally lead us to the consideration of that moral guide, and inestimable gift that God has bestowed upon us, his blessed Word, and particularly the Gospel, which points out to us with unerring certainty the path that we ought to follow, and the true course in which to steer upon life's stormy ocean, through the gloom that darkens our way. Without such a faithful guide we should wander in uncertainty, and never find the path that leads to God and celestial glory. In the divine Revelation alone do we find a certain and invariable rule, by which we may pursue, with courage and assiduity, the race that is set before us, and accomplish it with joy and felicity.

Let us attend to this, as the pilot attends to the polar star; and by continually keeping it in sight, prevent the possibility of erring. With this heavenly guide we shall shun all dangers, be preserved from shipwreck, and after our long and arduous voyage, at length happily arrive in that blessed haven where we shall rest from all our labour, and enjoy a happiness which nothing can molest or disturb!

The preceding reflection upon the polar star is also calculated to make us admire the goodness of God, who, by the position and the course of the stars, has given us the means of knowing the times, places, and different points of the heavens. An astronomer, though in an unknown country, can, by means of the stars, know where he is; and can inform himself of the month, the day, and the hour, with the same certainty as if he had consulted the most correct timepiece. If, for instance, we observe that the stars every day are seen four minutes sooner at the place where they were on the preceding evening, we know that in a month it will amount to two hours. Thus, the star that we see this evening, the 20th of December, at ten o'clock in a certain part of the heavens, will be seen on the 20th of January exactly in the same place at eight o'clock.

DECEMBER XXI.

Effects of Air when confined in Bodies.

The effects of air, inclosed in bodies, are very remarkable. The consequence of fluids freezing is well known. Water, in the act of congelation, often bursts the vessels which contain it. The barrel of a gun, filled with water, its entrance being hermetically sealed, when the cold is severe, bursts with great violence. At first this appears to be incomprehensible: we know that water is not of itself fluid, but becomes so by the caloric which every where pervades it, and consequently, when deprived of the matter of heat which it contains, becomes a solid mass. It should seem, then, that in their state of congelation, the particles of water must be condensed, and approach nearer to each other, and thus occupy less space than before they were frozen. On the contrary, at the time of freezing they dilate, and their volume increases, otherwise it would be impossible for the vessels to burst. Besides, how could ice swim, if it did not form a greater volume, and become lighter than when in a state of water.

What, then, is the cause of this singular effect? Internal air; for it is impossible to suppose any external cause. To be convinced that it is owing to the air contained in the water, we have only to observe that fluid when it first begins to freeze. Scarcely is the first pellicle of ice formed, when the water becomes agitated, and a number of air bubbles ascend. This upper coat of ice often rises in the middle and splits; the water springs up through the cleft, dashes against the sides of the vessel, and in running down again is frozen; thus giving the appearance of elevation and convexity to the middle of the surface. These effects are produced by the air contained in the water, and would not take place, or at least would appear in a much less degree, if, before the water began to freeze, it was exhausted, as much as possible, of the air which it contained.

On this principle we may explain many singular phenomena. A severe cold is very injurious to vegetables. We know that in all plants the sap circulates; which, though it becomes rather more viscous in winter and in autumn, nevertheless continues fluid. An intense degree of cold converts it into ice, and then evidently increases its volume, which cannot take place without causing several fibres and stalks of plants to burst. When this is the case, it is clear that when the sap becomes rarefied in spring, it cannot circulate as it ought to do, no more than the circulation of the blood can be carried on in an animal whose veins are cut. Thus, the growth of the plant is prevented, and it dies, because the nourishing juice can no longer flow through its vessels.

From all this we may be convinced of the power of the air, and of that expansibility from which we derive so many advantages. The property that this element has of condensation and of rarefaction, to an almost incredible extent, is the cause of the greatest revolutions that happen upon the earth. It is only in a very few instances that the power of this fluid can become injurious and then the evils which result are amply compensated by the advantages. We must, however, confess, that in this, as in every phenomenon of nature, there are many things which we are unable to explain : great part of our knowledge of the nature, properties, and effects of air, is conjectural, and perhaps it is reserved for succeeding generations to discover how false and erroneous our opinions upon this and many other subjects have been. Whenever, therefore, we contemplate the works of God in nature, let us examine them with caution, and investigate them with a mind humble, conscious of its own inefficacy, and ever mindful of the limited extent of our understanding, and the uncertainty of human judgment or opinions.

DECEMBER XXII.

Music.

To music we are indebted for one of the purest and most refined pleasures that the bounty of heaven has permitted to cheer the heart of man. As it softly steals upon our ear, it lulls to rest all the passions that invade our bosom, arrests our roving fancy, or in louder strains, excites the soul to rage. Often, when wrapped in melancholy, the sweet voice of music charms away our cares, and restores our drooping spirits, or awakens in us the sentiments of honour and of glory. And surely that which can assuage our griefs, pour balm into our perturbed breast, and make us forget our sorrows, is deserving of consideration, and should be made use of to glorify our beneficent Creator.

Whence proceeds the impression that music makes upon the ear? It is the effect of certain undulations of the air, which strike diversely upon the auditory nerve. When a light cord is pulled, its figure changes; for from its elasticity it not only regains its first situation, but advances beyond it, and continues vibrating backwards and forwards until it recovers its original position and state of rest. These vibrations of the cord are communicated to the air, which conveys them to other contiguous bodies. Thus, when an organ is played upon, if a lute be near, its strings will be put in motion, and make a sound. But whence proceeds the variation of sounds; and how is it that some are sharp and others flat? This is not owing to the quantity of air that is put in motion; for a sound may be flat or sharp, and at the same time strong or feeble. The differences of flats and sharps depend upon the greater or less rapidity of the vibrations of the air. A sonorous body emits a sharp tone when the vibrations are very quick; and a flat when they are more slow. Whence is it that certain sounds are harmonious, and charm the ear; whilst others offend by their discord? All that we can reply to this is, that the natural character of consonances consists in being in the same key; whereas in dissonance, the notes, though struck at the same time, do not accord, but produce a grating the ear that is extremely unpleasant. Let us, then, be grateful to the God of all love and mercy, for the raptures that we enjoy from the impressions of sound pouring music through our souls; and raise one general song of joy, to celebrate his praises, that shall ascend into Heaven, where the blessed angels of light will join in the full chorus of pure and heavenly harmony.

DECEMBER XXIII.

Men compared with other Animals.

In the comparison which we are about to draw between men and other animals, some things will be found which are common to both; others in which brutes will have the advantage over us; and others again where man will possess a decided superiority over them.

The principal resemblance between men and brutes is, that they are both material. Like them we have life and organized bodies, which are produced by generation and birth, and supported by food. Both have strength and animal spirits to enable them to fulfil the different functions that are assigned them; both have voluntary motions, the free exercise of their limbs, senses, sensations, imagination, and memory. By means of the senses, both experience the sensations of pleasure and of pain, which cause them to desire certain things and reject others; both have a [illegible] propensity for self-preservation, and the propagation of their species; and both are subject to those general corporeal accidents that the catenation and different relations of things, the laws of motion, the structure and the organization of their bodies, must occasion.

With regard to the pleasure that results from sensual gratifications, brutes have several advantages over men. A very principal one is, that they do not require the clothing, instruments of defence, [illegible] which men do, and which they are obliged to invent themselves, or to learn and to exercise the arts that are necessary to procure them. Animals bring with them into the world all that they require; or if any thing be still wanting, to obtain it they have only to follow the instinct which they have received from nature, and which never deceives them. It always conducts them in safety; and as soon as their appetites are satisfied, they are perfectly content, and desire nothing further; and they enjoy the present without being concerned for the future.

In these respects brutes are superior to men. Man is obliged to meditate, invent, labour, exercise himself, and receive instructions, without which he would remain as in a state of childhood, and would with difficulty obtain the necessaries of life. His passions so far from guiding him, tend to lead him astray. It is reason alone that constitutes the great and essential differences between him and brutes, indicates to him the means of satisfying his wants, and gives him prerogatives to which the brute creation can never attain. Gifted with the faculty of reason, man is enabled to procure every necessary, every convenience, and every luxury; to multiply all his pleasures, to ennoble and render them subservient to the best purposes. His soul enjoys delights that are unknown to brute animals; pleasures whose sources are knowledge, wisdom, re[illegible]on, order, and virtue, and which infinitely surpass all merely sensual gratifications, inasmuch as they tend to improve and promote the perfection of human nature, causing it more and more to resemble the divine essence of God; and they endure for ever; whilst, on the contrary, the more a man indulges in sensual gratifications, the more does he become unfitted for any thing great and dignified, and approaches nearer to the nature of brutes.

We may also add, that the sphere in which animals are obliged to move is very narrow and confined, their desires and propensities are few, and their pleasures little diversified; while those of man are infinitely varied; he is interested in all objects, and there is nothing which he cannot convert to his utility. He is the only being upon the earth that is progressively advancing towards perfection, continually making new discoveries, and enlarging his stores of knowledge; all other animals remaining constantly confined within a limited circle, neither capable of invention, nor able to attain to greater perfection; always continuing at the same point, unable by application and exertion to rise above other animals of the same species.

Reason, then, and its consequences, alone give us that decided superiority which we enjoy over the brute creation; and in it consists the chief excellence of our nature. To make use of reason, to ennoble the pleasures of the senses, to increasingly enjoy intellectual delights, to progressively advance in wisdom and in virtue, is the distinguishing characteristic of man; the great end for which he was created; and the chief object to which he should direct his attention.

DECEMBER XXIV.

Calculation concerning the Resurrection.

How numerous will be the crowd of human beings assembled together in the great day of the Resurrection! Supposing that Germany did not begin to be peopled till five hundred years after the general deluge, that is, about four thousand five hundred years ago; and that from the foundation of the city of Hamburgh at the above time, to the day of judgment, supposing that it was to happen at the present epoch, there have only been two hundred persons buried annually, reckoning one year with another; the number of deaths would amount to nine hundred thousand. If, then, a single city should produce so many human beings at the day of judgment, how many must the whole empire of Germany supply in the same space of time? Supposing that it contains twenty-four millions of inhabitants, the city of Hamburgh could not be estimated at more than the three thousandth part of the whole.

If that is the case, we may suppose, on the preceding calculation, that Germany alone would produce two thousand one hundred millions. This number is doubtless very great; and yet what is it compared with the produce of the whole earth, the present number of whose inhabitants is estimated at about one thousand millions? If we take this number, and make use of the same calculation as before, the sum total of deaths in the above-mentioned period of time will amount to eighty-seven thousand five hundred millions. And if now be added those that have lived before the deluge, and those who died during the next five hundred years, which may be reckoned at a fourth part of the preceding, we shall then have a total of one hundred and nine thousand three hundred and seventy-five millions. And lastly, let us add the number of people that will be alive at the day of judgment, which, estimating it at our former calculation of one thousand millions, will give a total of one hundred and ten thousand three hundred and seventy-five millions.

How inconceivable, then, must that Intelligence be, which can scrutinize the most secret thoughts of each individual of which such an infinite multitude is composed! an Intelligence that scans every hidden sentiment, word, and deed; which exactly remembers the hour of their birth, the duration of their life, the manner and circumstances of their death; and which knows how to distinguish the scattered atoms of each, and collect them together, whether their bodies had been reduced to ashes, dissolved into millions of particles, or undergone innumerable transformations. How omnipotent is the work of collecting these scattered particles, of purifying and ennobling them, and forming them into new, immortal, and incorruptible bodies!

We are informed by Divine Revelation, that hosts of angels shall gather the chosen from the four winds: that the sound of the trumpet shall awaken the bodies of the saints that slept! How delightful to the ten thousand times ten thousand thousand angels, will be the office of collecting their beloved brethren, and presenting them to Christ! How transporting for the myriads of blessed spirits whom God hath gathered in his bosom, again to receive the bodies which they had left, pale, emaciated, and disfigured by sufferings; torn and mutilated by violence, or consumed by fire, to receive them back, clothed with celestial beauty and splendour; light and radiant as the forms of the holy angels.

DECEMBER XXV.

Thoughts upon the Nativity of Christ.

What sentiments of joy and gratitude should the Christian feel on this day, when he celebrates the birth of Jesus! How great is my wonder when I meditate upon the circumstances which attended that glorious event! I represent to myself the Son of God in the lowest state of humiliation, clothed with a corporeal being, visible and weak as I am. How wonderful! The Son of the King of Kings, whom angels minister unto and adore, appears as a feeble babe, naked, destitute, and shedding tears, lying in a manger! How prodigious the change, from this humiliating and limited state of being, to be elevated, the Saviour of mankind, upon the throne of eternal glory! When I reflect upon my own unworthiness, and the infinite majesty of Him who offered himself up a sacrifice to human malice, and suffered every indignity that the ingenuity of men could devise, to be my Mediator and Redeemer, I feel my admiration and astonishment too great for utterance; and when I discover such a love as infinitely surpasses what the best of men can possibly merit, a love beyond all my powers of conception or hope, I am lost in astonishment, and can only silently admire and adore.

DECEMBER XXVI.

The Place of our Saviour's Nativity

To many individuals, at first sight, it may appear to be of little consequence to know the place of Christ's nativity; for we should regard him as our Redeemer, whatever may have been the circumstances which attended his mortal life. But as it pleased God to declare the place in which the Saviour of man should be born, it became necessary that it should happen precisely in the appointed place, that it might be one of the characteristics by which Jesus Christ should be known to be the true Messiah.

It is also very immaterial to us where we may live, provided that we find true happiness. There is no place upon the earth, however poor and despicable, that may not have better and more happy inhabitants than are found in the largest and most celebrated cities. Do we know a single spot upon the globe where the works of God do not present themselves under a thousand different forms, and where a person may not experience the sweet consolation arising from a well-spent life? For an individual, that place is to be preferred where he can receive and communicate the most good. For a number of people, that place is the best which contains the greatest proportion of wise and good men. Every nation declines in proportion as religion and virtue lose their influence over the minds of the people. The place where in our youth we contemplated the opening of the morn and the renewed beauty of nature, with all the raptures incident to that age; whilst we adored our God with all the veneration and love, which we felt so warmly in our hearts; the place sacred to our first effusions of pure and inviolable attachment to the object that we loved, or where two friends have pledged their mutual affection; the place where we have received the first rudiments of knowledge, or acquired the great principles of religion, and become examples of goodness and purity; ought to be very dear to us, and closely wound round the tendrils of our hearts.

According to these principles, Bethlehem, notwithstanding its smallness, was a venerable place, since it was the abode of so many pious people; and that singular acts of piety and devotion had been practised there. It was there the patriarch Jacob stayed some time to erect a monument to his much-loved Rachel. It was at Bethlehem that Naomi and her amiable daughter-in-law, Ruth, gave striking proofs of their faith and of their virtue; and it was there that Boaz, their generous benefactor, had his abode and possessions. At Bethlehem sojourned the humble Jesse, the happy father of so many sons; the youngest of whom ascended from the pastoral crook to the sceptre of Israel. It was there that David formed the resolution of building a house to the Lord, and showed himself the true shepherd and father of his people; when, at the sight of the exterminating angel, whose sword carried with it death and dismay, he interceded for the afflicted sufferers. At Bethlehem was born the Prince Zerubabel, the descendant of David; who was the type of that Ruler and Shepherd, under whose banners Israel was one day to assemble, in order to enjoy uninterrupted felicity. Lastly, in this city appeared the Son of God, who, by his birth, laid the foundation of that salvation which, as Redeemer, he purchased for the whole world.

Thus, in a place of contemptible size and mean appearance, we sometimes see men spring up, who become the fathers and benefactors of the human race. And often a village unknown to fame has given birth to a man who, by his wisdom, uprightness, or heroism, has been a blessing to whole kingdoms.

It is our duty, whether our lot be cast in towns, in hamlets, or in cities, so to live, that the end for which our Saviour was born may be accomplished in us. It is certain that true piety would make much more rapid progress upon the earth, if men every where endeavoured to give proofs of the innocence of their manners and the fervency of their faith; and become examples of patience, diligence, and uprightness. If our cities presented more patterns of virtue, their influence might extend to the inhabitants of the country: so that every village and hamlet might contain families who, like Joseph and Mary, distinguished themselves by their devotion, and obtained respect and esteem for their piety, though dwelling in poverty and obscurity. God would scatter his blessings over the country of these good people; and after some generations, we might reasonably expect that a people would be formed full of the fear of the Lord, and walking carefully in his ways. He who has traversed the extent of the globe, has visited cities, and the splendid domains of royalty, and has witnessed all the diversified species of iniquity, and crimes of every hue, that are there practised, has abundant cause to be thankful to God when at last he finds some town or village where, in a peaceful cottage, and surrounded by his family and friends, he may devote himself entirely to the service of God, and the benefit of his fellow-creatures; and thus attain that sweet content and heavenly peace of mind, which alone can be the result of good actions and an innocent heart. He will not then regret those place that he has once seen; more splendid, indeed, but where sensual pleasure spreads all its snares; more vast and grand, but where vice is triumphant; more rich, but where the people live in the forgetfulness and in the neglect of the duties which they owe to God and to man. To all these he will prefer an obscure retreat, where, safe from the pangs of remorse, and the upbraidings of a conscience ill at rest, he may spend his days in peace and in joy.

DECEMBER XXVII.

Care which God takes of Men from the Time of their Birth.

The wants of our infancy are numerous! With pain and difficulty we come into the world; and should soon lose the life we had but just begun to feel, if the various things necessary for our food and clothing were not prepared beforehand; and if there were not persons to take care of us in our weak and helpless state, when we are destitute of all things; or rather, if our Heavenly Father himself did not watch over us for our preservation. He took care of us whilst we were in our mother's womb; at a time when no human wisdom or industry could assist us. It is he who fashioned our bodies, and arranged and connected together all their various parts. He has given to each of the veins its particular direction; and pours through them all the vital fluid. He has clothed us with skin and with flesh; and has given us bones and nerves: and by diffusing through all these an intelligent and a rational spirit, has formed a being worthy of bearing his own divine semblance. The same Providence which watched over us at the time of our first being, has graciously continued his paternal cares, and has never forgotten us. And he is not merely satisfied with providing for all our necessities, by giving us fond and affectionate parents, who, whilst we are unable to do any thing for ourselves, tenderly cherish and preserve us as their greatest blessing and delight: but he has done more;

he has laid the foundation for our future happiness. At the time of our birth the causes which would influence our future welfare already existed, and began to operate according to the views of a wise Providence. How much the comforts or the misery of our lives depend upon our parents; their opinions, rank, fortune, and connections! How much the happiness of our lives must be influenced by our early education, the examples that are before us, the connections that we form, the opportunities that occur of exercising our powers, and developing our faculties. And is it not God, our Father, whose wisdom and goodness ordered all these things for our present and eternal happiness? How consoling, then, is the thought, that a Being infinitely good, wise, and powerful, has watched over us before we were born, guarded our tender infancy, and determined and regulated all that we shall require in the course of our lives!

DECEMBER XXVIII.

Period of Human Life.

Every man dies precisely at the time that God, in his eternal wisdom, has appointed: As the time of our birth is fixed, so also is that of our death. But the term of life is not subjected to an inevitable fatality or necessity; such things do not exist. Every thing that occurs may happen sooner or later, or not at all; and the man who died to-day, might have died sooner, or lived longer. God has not numbered the days of any particular individual by an absolute and arbitrary decree, or without having a regard to the circumstances in which the individual may be placed. God, being infinitely wise, can do nothing without motives that are worthy of his divine nature. He must, then, have just reasons for determining that such a man should leave the world at one time rather than at another. Yet, though the term of life be in itself neither affected by necessity nor fatality, it is certain; and can never be really changed.

Whenever a man dies, some cause must infallibly lead to his death; these, however, may at any time be suspended by the Supreme Being. One man dies of some mortal disease, another by a sudden and unforeseen accident. One perishes by fire, another by water. All these causes God has foreseen: neither has he been an idle or an indifferent spectator; he has examined them all with care, compared them with his views, and has seen whether he will approve of them or not. If he approves of them, they are determined; and, in that case, there exists a Divine decree, by virtue of which a man will die at a certain time by some particular accident or contingency. This decree can neither be revoked nor prevented, for the same reasons which might influence God to take a man from the earth at this present time, were known to him from all eternity; and his wisdom would enable him to form the same judgment then that he would in the present instance. What, then, should induce him to revoke his decrees?

It may, however, happen that God, foreseeing the causes of the death of a particular individual, did not approve of them. In this case he has at least determined to permit them; or otherwise they could not have taken place, nor the individual have died. And if the permission of these causes of death has been determined, God then wills that we should die in the time when these causes shall exist. It is true, he might have been disposed to grant us a longer life, and not approve of the causes of our death; but it was inconsistent with his wisdom to counteract their operation. He saw the universe collectively, and found reasons which induced him to permit that a man should die at a particular time, though he neither approved of the causes, manner, nor circumstances of that death. His wisdom finds means to direct that death to the most useful purposes; or he foresaw that a longer life, in the particular circumstances in which a man was placed, could neither be of advantage to him, nor to the world in general: or he saw, that to prevent that death, a new and perfectly different combination of things was requisite; a combination that could not accord with the general plan of the universe, and which would prevent still greater good from taking place. Thus, although God may sometimes disapprove the causes of a man's death, he has, nevertheless, sufficiently wise and just reasons to permit them to take place; and consequently to determine that a man shall die at a particular time, and by certain means. These considerations are well calculated to make us regard death with Christian resignation and fortitude. What principally renders it so formidable is the uncertainty of its approach, and the manner in which it seizes us. If we knew beforehand how and when we should die, we might prepare to meet the awful hour with resolution. But as that is very seldom the case, nothing is more effectual to strengthen our minds and tranquillize our thoughts upon that event, than the belief in a Providence which watches over our lives; and which, from before the foundation of the world, has determined, with infinite wisdom and goodness, the time, the manner, and all the circumstances of our death. The term of our lives is then appointed; and nobody can die sooner or later, than God, in his infinite mercy, has determined for the good even of the individual himself. Persuaded of this consoling truth, let us calmly await the hour of death: and since its arrival is uncertain, let us be wise enough to prepare for it at all times, and be found in a state of readiness whenever it may happen; knowing that the period will be that which God has judged will be the best for us. It is true, we are ignorant what will be the manner of our death, and the particular circumstances attending it; but it is sufficient to know and to believe, that we can only die in that way and at that time, which our heavenly Father shall deem to be the best for our ourselves, and for all those connected with us. Strengthened by this belief, we shall continue to pursue our terrestrial pilgrimage without inquietude: submitting patiently to all the dispensations of Providence; fearless of the dangers to which the performance of our duty may expose us.

DECEMBER XXIX.

The Instability of Earthly Things.

NOTHING exists in nature whose state and manner of being is not liable to change. Every thing is the sport of frailty and inconstancy: nothing is so durable as always to retain its present appearance. The most solid and compact bodies have not such a degree of impenetrability, and so close an union of the parts which compose them, as to be exempted from dissolution and destruction. Every particle of matter insensibly changes its figure. How many changes have our bodies undergone since their first formation in our mother's womb! Every year we lose some of our constituent parts, and again acquire new ones. Every thing upon the earth grows and decays by turns; only in some bodies these changes are not so frequent and great as in others. The heavenly bodies appear to be the same as they were at their first creation: and perhaps they are the least changeable of all bodies. Yet attentive observers have noted the disappearance of certain stars from the heavens; and the changes which take place in the spots that appear on the sun, prove that he is not always in the same state. Besides, his motion subjects him to different variations, and we have reason to believe he undergoes at times various internal revolutions. All that we can know of them is conjectural, because of the immense distance that we are from him; and, no doubt, if we are able to observe them near enough, we should discover as much instability in all the heavenly bodies, as we do upon our earth.

The year, which in two days more will terminate, furnishes abundant proofs of the uncertainty and frailty of all earthly things. Confining ourselves to the small circle in which we move, how frequent are the changes that we witness! Many of those people whom we have known for many years are no more: many whom we have seen smiled upon by fortune, are now groveling in poverty; or reduced from a state of rank and influence, to mediocrity and dependence. If we examine into ourselves, we shall also find we have undergone various changes. Our health and activity may have decayed, we may have been subjected to misfortunes, sickness, and the infidelity of those whom we trusted.

Such reflections are gloomy and sorrowful, and might even reduce us to despair, if we were not supported and consoled by religion, which leads to an almighty, unchangeable, and eternal Being, in the full assurance of whose unalterable goodness and love, let us submit with resignation to all the vicissitudes of this transitory world.

DECEMBER XXX.

Retrospect of our Lives.

THE termination of another year of our lives should induce us to make some reflections, which, though of the utmost importance, do not in general occupy so much of our attention as they ought. That we may feel more sensibly how short is the period of our lives, let us examine how we have passed the days that we have already lived, however humiliating a task it may be.

Let us first consider those days, the employment of which it was not in our power to regulate. How much of this year has been passed in eating, drinking, and sleeping; in taking care of our bodies, and providing for our necessities! How much time has been spent in useless occupations, without any advantage gained for our immortal souls! How many hours have been passed in uncertainty and inaction; in perplexity, and in expectation! So that when we make the days of the year pass in review before us, we shall discover how numerous those have been that were unproductive of any intellectual good and how very few have been employed in acts of real utility either to ourselves or to others; and of those few, how many hours have been sacrificed to vice, and devoted to sin! How humiliating and afflicting is the recollection, that so many of the hours allotted to us by Almighty Goodness have been lost in idleness, or lavished in folly: hours that can never be recalled, in which we have wandered far from the best and tenderest of Fathers! Perhaps they have been profaned by impiety, envy, jealousy, and slander; or sacrificed to the world, to vanity, to indolence, and to false pleasures; all tending to divest our hearts of the love of God, and charity for one onother. Instead of employing them in the promotion of righteousness, perhaps we have devoted them to oppose the cause of truth, and to combat the designs of Providence, giving trouble to society, and molestation to the church. And, lastly, how rapidly does the short space that we have to remain upon the earth fly away! Year after year passes by almost imperceptibly, before we even notice it; and then it is impossible to be brought back.

Father of Mercy! forgive us the faults we have had the misfortune to commit; and grant that in the awful hour of death, the manner in which we have passed our last year may not cause anguish to prey upon our hearts.

DECEMBER XXXI.

Hymn of Thanksgiving for the Close of the Year.

Lord, thou art the God of time: thou art also the God of eternity! I will sing a joyous song to thy praise; I will celebrate thy holy name A year is about to finish its course; to what do I owe the continuation of my existence? It is to thy grace alone, and to thy paternal love!

Being of Beings, receive my adoration! Thou art immutable; thou hast been, thou art, and thou shalt be, through all eternity! Thy love endures from generation to generation; and each morning brings a renewal of thy goodness!

Thou hast led me by thy paternal care through the year that is now ending: when my heart was preyed upon by care and sorrow, thou visitedst it by thy consolation and assistance. I will praise thee and exalt thee from the depths of my soul; and again commit myself to thy wise and unerring guidance.

Pardon, O my God, those innumerable errors which I have committed against thee in the days that are passed. And let me again experience, for Jesus Christ's sake, thy paternal support. Teach me to do thy will and thy pleasure all the days of my life!

The world passes away, and its pleasures disperse: it is not in these, therefore, that I am to seek my happiness. Even here below I may aspire to nobler joys. I am allied to angels, and heaven is my patrimony:—Grant, O God, that I may incessantly aspire after it!

Teach me, O God, to redeem my time; and to walk with holy circumspection in the way that leads to eternity! Condescend to alleviate the burthen of life, till I attain the happy period when all my labours shall cease, my repose no more be interrupted, and when I shall enter into the eternal kingdom of joy and peace!

THE END. AMEN.

JAMES ROBBINS, Printer,
Winchester.